

ENERGY POVERTY IN GREECE

POLICY DEVELOPMENTS
AND RECOMMENDATIONS TO
TACKLE THE PHENOMENON



HEINRICH BÖLL STIFTUNG
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FOREWORD

It is estimated that more than 50 million households across Europe are affected by energy poverty. The effects of the phenomenon manifest as limited or complete lack of access to basic energy services for households evidently unable to adequately heat cool or secure basic energy services in their residencies at affordable cost. Consequently detrimental repercussions on citizens' health and wellbeing as well as on the environment are brought on.

Following the intention of the European Union to establish an Observatory for data collection that will measure and monitor the prevalence of energy poverty, the former Vice-president of the Energy Union Mr. Maroš Šefčovič during his speech in January 2016 stated that on course to the energy transition from traditional energy fuels to renewable energy sources, the social aspects of this necessary, radical transformation of our energy systems should not be ignored and it is mandatory that measures be taken for the safeguarding of the weakest and most vulnerable citizens¹.

Energy poverty is prevalent not only in less financially prosperous countries like Greece but it is also becoming progressively noticeable in more affluent ones. Though partially driven by and connected to income poverty, the phenomenon of energy poverty is recognized as a problem in its own right and as a distinct type of poverty affected by multiple factors like the rising cost of energy, inadequate energy performance of buildings and appliances etc. Indicative of this awakening is the fact that for the first time most of the National Energy and Climate Plans submitted by Member States of the European Union in 2018 raise energy poverty to the status of a challenge that needs to be addressed. Since consensus has not yet been reached regarding the detection and measuring methods of the issue, we still lack a common pan-European definition of energy poverty. It is worth mentioning however that Greece is the first country to include such ambitious quantitative targets in its National Energy and Climate Plan and aims for achieving 50% decrease in energy poverty rates by 2025 and 75% decrease by 2030².

¹ European Commission, Press Release Database (January 2016): Speech by Vice-President for Energy Union at the European Policy Centre. Available on : <http://bit.ly/energypoverty-1>

² Right to Energy Coalition (May 2019): Keeping the lights on: Which E.U countries are taking action on energy poverty? Available on : <http://bit.ly/energypoverty-2>

Energy Poverty in Greece: Social Innovation Recommendations to tackle the phenomenon, a study published by the Heinrich Böll Stiftung, Thessaloniki Office in 2017, is believed to have contributed to giving prominence to this social problem and to have initiated debate on the need to address it consistently and effectively. The present updated publication contains new policy developments in Europe and in Greece; the establishment of the European Union's Energy Poverty Observatory, the reviewed policy packages "Clean energy package for all Europeans", the approval of the legislation on Energy Communities in Greece (Law 4513/2018 of the Greek Parliament) as well as the findings of opinion surveys regarding energy poverty awareness among citizens who live in Greece. Finally, it comprises interesting examples and holistic policy proposals endowed with the potential to address this problem in a collaborative and socially innovative manner.

We would like to thank our collaborators on this project who contributed to the present publication and we hope that the findings of this study will be considered in the processes of drawing up the National Energy and Climate Plan and the National Action Plan for Energy Poverty tackling.

Heinrich Böll Stiftung, Office Thessaloniki, Greece

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1. EXECUTIVE SUMMARY AND INTRODUCTION TO ENERGY POVERTY

The phenomenon of energy poverty and the resolution of the problems induced by it on modern society constitute a challenge on global scale. Energy poverty is a pressing problem affected by the complicated interaction of multiple factors – the increase of energy prices, people’s inability to pay their energy bills, flat or failing income, high levels of unemployment and the slow pace at which implementation of energy-efficient measures in residencies is taking place. The evidence-based, adverse effects of the aforementioned interaction are felt on social, environmental and financial levels. The way to tackle the problem has yet to be paved.

Discussions revolving around energy poverty first started in Europe in the late 1970s. Isherwood and Hancock (1979)³ introduced an early definition and an indicator to monitor the phenomenon. However, it was not until the European Union’s “Third Energy Package” preparatory stages in 2009 that the term was first used by European Union institutions. The increasing importance of the issue and its implications within the political sphere of the European Union is established and documented by the publication of *“Energy Poverty – The Impact of Liberalization and the Economic Crisis”* – an Opinion of the European Economic and Social Committee on the 14th of July 2010 which deduces that “energy poverty affects the energy sector” and “other sectors such as health, consumer affairs and housing”.

Nevertheless and despite the fact that forty years have elapsed since the first attempts at defining energy poverty, there is still no generally accepted definition of the phenomenon at European level. This fact inhibits an accurate population and household census that would assist in quantifying the extent to which energy poverty affects or threatens citizens and households, and apparently hinders the development of effective strategies to mitigate its impact.

In developing countries, *energy poverty* is primarily experienced as lack of access to basic energy services. According to estimates published by the International Energy Agency (IEA), more than 1.3 billion people⁴ do not have access to electricity and consequently lack access to ser-

³ The University of Sheffield (August 2012): Fuel Poverty Perspectives from the Front Line. Available on <http://bit.ly/energypovetry-3>

⁴ Worldwatch Institute: Energy Poverty Remains a Global Challenge for the Future. Available on: <https://bit.ly/3iePsJs>

vices and provisions that the rest of the population take for granted. According to the United Nations statistics, another important aspect of the problem is that 1 billion people⁵ have access to energy services and provisions albeit unreliable. The fact that approximately 20% of the global population is deprived of access to electricity⁶ reflects the prevalence of energy poverty on global scale as well as the magnitude of the problems stemming from this predicament.

Across developed countries, among which Member States of the European Union, the concept of *energy poverty* is perceived differently. In these countries energy poverty mainly suggests permanent or temporary inability to access energy services and provisions. It is estimated that more than 50 million households in the E.U⁷, equating 10% of the population, struggle with the phenomenon and its implications according to the European Union's Energy Poverty Observatory (EPOV).

More specifically, a study conducted by the Buildings Performance Institute Europe (BPIE, 2015)⁸ groups Greece - along with Bulgaria and Cyprus – with countries in which energy poverty constitutes a major issue. In particular, 70% of the population in Greece are unable to ensure and maintain adequate heating in their dwelling places. 50.7% of the population default on their energy bills while 29.5% dwell in sub-standard housing. These percentages are much higher than the European averages which are 10.8%, 10% and 15.1% respectively. It is safe therefore to deduce that although energy poverty may not fully overlap with income poverty, it is more often than not connected to it.

WHAT IS ENERGY POVERTY?

The term *energy poverty* in essence describes the households' inadequate or complete lack of access to energy.

As noted above there is still no commonly accepted definition of energy poverty. The first attempt towards a definition was made in the United Kingdom limiting though it was, since it concentrated on fuel poverty and aimed at securing adequate heating for residencies through adequate and sufficient fuel usage. The definitions in use during the 1980s focused on the "inability to keep homes adequately warm"⁹. A more inclusive current definition of energy poverty makes reference to all the potential energy uses of a household. Both definitions however are still - up a certain degree - used interchangeably to discuss and describe the same phenomenon.

The first commonly accepted definition of energy poverty was introduced by Brenda Boardman in the United Kingdom in 1991. It was based on calculating heating expenses of households and suggested that households spending more than 10% of their income on such expenses should be considered energy poor. It was not until 17 years later though that this definition was included in legislation and the term *necessary expenditure* to accommodate en-

⁵ Worldwatch Institute: Energy Poverty Remains a Global Challenge for the Future. Available on: <https://bit.ly/3iePsJs>

⁶ Brookings (October 2013): Electricity Access in Emerging Markets. Available on: <http://bit.ly/energypoverty-6>

⁷ EU Energy Poverty Observatory: What is energy poverty? Available on: <http://bit.ly/energypoverty-7>

⁸ BPIE (2015): Fuel poverty mitigation through energy efficiency in buildings. Available on: <https://bit.ly/2GghCXc>

⁹ Science Direct (September 1983): Social policy options and fuel poverty. Available on: <http://bit.ly/energypoverty-9>

ergy needs was introduced. In 2000 the “Warm Homes and Energy Conservation Act 2000” was voted and publication and implementation of energy poverty mitigation strategies were included in its stipulations¹⁰.

An updated definition by the European Economic and Social Committee (opinion TEN/420) describes energy poverty as “*the situation in which households are not able to adequately heat their homes or meet other required energy services at an affordable price*”¹¹.

In general, the 10% income threshold is widely used in the bibliography to establish the conditions of energy poverty. However, this conventional indicator does not always allow full assessment of every given situation since it fails to include households which due to unaffordable costs under-consume energy in their residencies and thus fail to satisfy basic needs.

Another commonly used indicator which is considered when defining energy poverty is the excess mortality rate, mainly during winter. According to a study conducted in 2016¹², 1% - 2.7% of registered deaths in Greece, 2.7% - 7.4% of cardiovascular diseases and 3.1% - 8.5% of respiratory infections treated in Greek hospitals were attributed to energy poverty. Excess mortality rate is strongly linked to severe weather conditions and consequently to extremely low temperatures (or excess heat during summertime) in the residencies¹³.

Apart from the well-established objective methods for measuring energy poverty, a subjective or indirect approach may also be applied. This can either take the form of personal self-reported views on the assessment of the households’ thermal comfort or be deduced from indirect data sources such as arrears on utility bills. Based on this approach, Kolokotsa and Santamouris (2015)¹⁴ noted that energy poverty is underpinned by three parameters; inability to retain inner heat, arrears on utility bills and sub-standard living conditions.

The concept *energy vulnerability* has recently emerged in the studies on energy poverty. The specific approach maintains that accepting the changeable nature of the phenomenon regarding space, time and its adjacent conditions will allow us to integrate energy poverty into a wider field of study. Thus, the best possible analysis of the factors that aggravate the households’ energy problems and their implications can be achieved^{15, 16}. The concept of *energy vulnerability* springs from the definition of the *vulnerable consumer* which suggests the financially weak household consumer¹⁷. It is strongly connected to the inability to increase energy efficiency in

¹⁰ The University of Sheffield (August 2012): Fuel Poverty. Perspectives from the Front Line. Available on: <http://bit.ly/energypoverty-10>

¹¹ EESC - European Economic and Social Committee (September 2013): For coordinated European measures to prevent and combat energy poverty. Available on: <http://bit.ly/energypoverty-11>

¹² Science Direct (November 2016): Fuel poverty in Greece: Quantitative analysis and implications for policy. Available on: <http://bit.ly/energypoverty-12>

¹³ Science Direct (December 2015): Mapping the effects of urban heat island, housing, and age on excess heat-related mortality in London. Available on: <http://bit.ly/energy-poverty-13>

¹⁴ Science Direct (December 2015): Review of the indoor environmental quality and energy consumption studies for low income households in Europe. Available on: <http://bit.ly/energypoverty-14>

¹⁵ Wiley Online Library (August 2013): Energy poverty in the European Union: landscapes of vulnerability. Available on: <http://bit.ly/energypoverty-15>

¹⁶ Sage Journals (October 2016): A critical analysis of the new politics of fuel poverty in England. Available on: <http://bit.ly/energypoverty-16>

¹⁷ SSRN (March 2016): From Fuel Poverty to Energy Vulnerability: The Importance of Services, Needs and Practices. Available on: <http://bit.ly/energypoverty-17>

the residence and clearly relates to the existing infrastructure. It is also linked to social and financial poverty and prosperity and evidently raises health concerns¹⁸.

For the past two years a new initiative by the European Commission, the European Union's Energy Poverty Observatory has been aiming towards assisting Member States of the European Union in their efforts to combat energy poverty and has initiated the use of four distinct primary indicators¹⁹ to define the phenomenon and capture all its aspects. The first two indicators are based on data obtained from the European Union Statistics on Income and Living Conditions (EU-SILC)²⁰ and illustrate limited access to energy services while the other two are computed using household income and/or energy expenditure data. More specifically these indicators are:

1. Arrears on utility bills
2. Hidden energy poverty linked to sub-standard living conditions
3. Inability to keep houses adequately warm
4. High share of energy expenditure on income

Secondary energy poverty related indicators such as energy prices and housing-related data are also included²¹.

In the beginning of 2019 the European Climate Foundation commissioned the report European Energy Poverty Index (EEPI)²² which for the first time enables the scientific and technical communities to assess the progress that Member States of the European Union have accomplished in alleviating domestic energy poverty, transport energy poverty and their nexus. Consequently, assessing progress made in alleviating energy poverty and in mitigating its effects can be accomplished within a unified framework by utilising an interactive map and by placing common measures for each country. Sadly, only five of the 28 Member States of the European Union²³ have adopted a formal definition of energy poverty to date (Table 1).

¹⁸ Energee Watch: Fuel poverty and energy vulnerability in Europe. Definitions and indicators.

Available on: <http://bit.ly/energypoverty-18>

¹⁹ EU Energy Poverty Observatory (April 2019): Indicators & Data. Available on: <http://bit.ly/energypoverty-19>

²⁰ Eurostat: European Union Statistics on Income and Living Conditions. Available on: <http://bit.ly/energypoverty-20>

²¹ EU Energy Poverty Observatory (April 2019): Indicators & Data. Available on: <http://bit.ly/energypoverty-21>

²² European Energy Poverty Index (January 2019): Assessing member states' progress in alleviating the domestic and transport energy poverty nexus. Available on: <http://bit.ly/energypoverty-22>

²³ EU Energy Poverty Observatory (August 2018): Addressing energy poverty in the European Union: State of play and Action. Available on: <http://bit.ly/energypoverty-23>

TABLE 1: Formal definitions of energy poverty in Member States of the EU

United Kingdom (2010 and 2013)	Ireland, Scotland and Wales: a household is considered fuel poor if it needs to spend more than 10% of its income on fuel in order to maintain an adequate level of warmth ²⁴ . England: a household is considered energy poor if its energy expenditure is above the national median level and this expenditure leaves its income below the official poverty line ²⁵ .
France (2009)	The inability to use sufficient energy to create conditions of thermal comfort renders an individual, energy poor.
Cyprus (2013)	"Individuals who are Cypriot citizens or citizens of Member States of the European Union and are related to the above and reside permanently in the Republic of Cyprus fall into the category of energy poor if they receive public allowance from the Social Services of the Ministry of Labour and Social Security of Cyprus" ²⁶ .
Slovakia (2015)	Energy poverty is the status when a household's monthly average expenditures on energy make up a substantial share of the average monthly income of the household.
Ireland (2016)	A household that spends more than 10% of its income on energy needs is considered energy poor.

Taking the above into consideration, we deduce that defining energy poverty is arguably the first and most crucial step towards combating the phenomenon. Following identification of the source of the problem and its underlying causes, strategies can be planned, policies applied and financial instruments formulated to alleviate households that suffer from or are threatened by the effects of energy poverty.

ENERGY JUSTICE AND ENERGY DEMOCRACY

Energy justice has emerged as a new inter-disciplinary research field into the Social Sciences discipline which strives to develop and apply principles of justice on energy policy, energy generation, energy consumption, energy safety and climate change²⁷. In line with efforts to curb climate change it seeks to abolish conventional fuels and to "democratise" the sector by advocating citizens' active participation in the energy sector which is deemed a prerequisite to a socially just energy transition²⁸.

²⁴ UK Department of Energy and Climate Change (October 2010): Fuel poverty methodology handbook. Available on: <http://bit.ly/energypoverty-24>
²⁵ UK Government (June 2019): Fuel poverty statistics. Available on: <http://bit.ly/energypoverty-25>
²⁶ Government Gazette of the Republic of Cyprus (June 2013): Defining Energy Poverty. Available on: <http://bit.ly/energypoverty-26>
²⁷ Science Direct (January 2016): Energy justice: A conceptual review. Available on: <http://bit.ly/energypoverty-27>
²⁸ Center for Earth, Energy and Democracy (2015): Climate justice & energy democracy. A platform vision. Available on: <http://bit.ly/energypoverty-28>

Dr Nicolette Fox published her work *Here Comes the Sun*²⁹ inspired by the concept of energy justice. In collaboration with seven families Dr Fox studied the solar panels' effectiveness on decreasing energy consumption and by extension energy poverty rates. Energy self-generation and reduced energy consumption levels persuaded the families to alter their entire philosophy on energy. Participation in the energy generation for own benefit, familiarisation with the procedures and finally simplification of technical terms and terminology for more comprehensive understanding are considered meaningful expressions of energy justice.

Energy democracy is an emerging social trend that seeks to offset extraction of fossil fuels by making the transition from fossil fuels to more human-friendly and environmental-friendly forms of energy. The integration of technological advances is paramount to linking social justice and social equity to energy innovation³⁰. In essence, energy democracy secures active participation of citizens, of municipal authorities and of small and mid-sized businesses in a consortium guided by the principles of social justice.

The current legislation (Law 4513/2018 of the Greek Parliament) on energy communities paves the way for the creation of Energy Communities in Greece³¹. It is strongly believed that citizens' active participation in energy consortiums that will generate and consume energy can play a pivotal role in combating energy poverty.

Given the facts pointed out above and the current financial recession but also the need for near-zero energy buildings, it is evident that times call for radical changes in energy generation and its usage, in the manner in which society regards energy (for example as a public good) and in the role that citizens themselves are called to play (energy cooperatives). It is of the utmost importance to form effective policies considering things from their social, financial as well as environmental perspectives since these changes must be implemented in a way that will cater to the needs of the most vulnerable citizens.

²⁹ SPRUSussex (November 2015): Take 7. Available on: <http://bit.ly/energypoverty-29>

³⁰ Science Direct (November 2017): Energy democracy: Goals and policy instruments for sociotechnical transitions. Available on: <http://bit.ly/energypoverty-30>

³¹ TaxHeaven (2018): N. 4513/2018 Energy Communities and other provisions. Available on: <http://bit.ly/energypoverty-31>

2. ENERGY POVERTY DEVELOPMENTS AT EUROPEAN AND NATIONAL LEVELS

Energy poverty was introduced in the European policy agenda in 2006. Having placed the phenomenon under the microscope, much progress has been made since in tying it to climate change curbing, in achieving a just energy transition and most importantly in pointing out the threats it entails to public health and wellbeing along with developing appropriate remedies. The second part of this study focuses on policies and measures directly or indirectly connected to energy poverty tackling in Europe and in Greece. Each presented policy development is based on interviews held with experts in the fields and is followed by brief, distinct commentary by the authors of the study. Analysis is attempted on:

- The amendment of the “Clean energy package for all Europeans”
- The establishment of the EU Energy Poverty Observatory (EPOV)³²
- The empowerment of the National Energy Poverty Observatory
- The implementation of the “Saving at Home II” programme
- The implementation and widening of the scope of policy measures such as “market-based instruments”

³² EU Energy Poverty Observatory, Website. Available on: <http://bit.ly/energypoverty-32>

2.1 AMENDMENT OF THE CLEAN ENERGY PACKAGE FOR ALL EUROPEANS

INTERVIEWS HELD WITH:

- Savvas Politis, Joint Research Centre, European Commission
- Maria Kottari, Joint Research Centre, European Commission

The “2030 Climate and Energy Policy Framework” was approved in October 2014³³. It establishes the basis and introduces European Union’s policies on climate and energy for the time period 2020-2030. At the same time it backs European Union’s position during the United Nations Climate Change Conference (COP21) held in Paris in 2015. By February 2015 citizens are placed at the heart of the Energy Union’s framework-strategy which “by developing a reliable and transparent governing system free of administrative burdens will assist the European Union in achieving the intended energy policy objectives and targets”. The strategy has been comprehensively updated and enriched by specific proposals included in the “Clean energy package for all Europeans”³⁴. In order to achieve this and tackle energy poverty effectively, the European Commission set as its priority and brought forward key proposals for effective measures as part of its clean energy policy. This was materialised with the publication of the Internal Market for Electricity Directive³⁵, the Energy Efficiency Directive³⁶, the Energy Performance of Buildings Directive³⁷ and the Regulation for the Governance of Energy Union³⁸.

Energy poverty appears for the first time as a policy matter in the “Third Energy Package”³⁹ which intended to amend the internal energy markets’ operation. This policy matter was examined from the perspective of the vulnerable consumer and an effort was made to curtail the risks connected to energy price increases. Since there is a close correlation between energy poverty, low income and energy inefficient residencies, the urgency to tackle these issues along with energy poverty is recognised.

Lack of a common pan-European definition is primarily attributed to the differences among the national frameworks of Member States of the European Union as well as to the respective ways that energy poverty is perceived and therefore tackled. A suite of appropriate indicators which in combination will measure and monitor the expansion of energy poverty should be adopted and adjusted to the varying conditions of each country.

It should also be highlighted that potential increase in energy pricing leads to increased administrative burdens and by extension to excess cost for households and the industry alike with both outcomes affecting European Union’s competitiveness. A detailed analysis conducted by the European Commission on prices and energy costs in Europe⁴⁰ explains how increased prices affected consumers and poor households during the ongoing financial and economic recession of that period. To protect vulnerable consumers in the short-run, implementation of social policy measures rather than energy pricing is recommended. However, a free energy market is expected to boost competitiveness (by improved tariff schemes in collaboration with the current suppliers or by transitioning to more affordable energy suppliers) and to render more efficient and affordable

³³ Conclusions adopted by the European Council. Available on: <http://bit.ly/energypoverty-33>

³⁴ European Commission Press Corner. Available on: <http://bit.ly/energypoverty-34>

³⁵ Directive. Available on: <http://bit.ly/energypoverty-35>

³⁶ Directive. Available on: <http://bit.ly/energypoverty-36>

³⁷ Directive. Available on: <http://bit.ly/energypoverty-37>

³⁸ Regulation. Available on: <http://bit.ly/energypoverty-38>

³⁹ Summary of Third Energy Package Provisions. Available on: <http://bit.ly/energypoverty-39>

⁴⁰ Communication from the European Commission (COM/2014.021). Available on: <http://bit.ly/energypoverty-40>

energy. Improving energy efficiency and promoting innovation in new technologies can secure stable energy cost and increased energy saving in households. Provisions to this effect are included in the “Clean energy package for all Europeans” which go beyond the scope of tariffs or social benefits but bring forward ways to address energy poverty in a more holistic and coherent way.

Among the objectives set in the Package, priority is given to energy efficiency and empowerment of the role of the consumers in the national internal electricity markets. Both actions are expected to contribute to energy poverty mitigation at national and by extension at European level. To be more specific, concentrated efforts to ameliorate energy efficiency, will give rise to the issue of energy poverty as a concern that calls for specific energy policy interventions. The Energy Efficiency Obligation Scheme for energy providers/distributors is part of the Amended Directive on Energy Efficiency. The targets of this mechanism are long-term energy saving and cost reduction for the benefit of the consumers. The amended Energy Performance of Buildings Directive, in line with similar ordinances aspires to decrease energy poverty rates down to 3.2 million households across the European Union⁴¹. Energy performance interventions on buildings should be looked upon as an opportunity to upgrade the interior of residencies and therefore ameliorate European residents’ living conditions.

The approved Regulation for the Governance of the Energy Union constitutes the main tool in tracking energy poverty since it integrated energy poverty issues in the national energy and climate strategies. The Regulation additionally promotes the development of a common strategy and methodology to tackle the phenomenon. The amended Directive on internal electricity market contends that low income, excess energy expenditure and buildings’ low energy performance are interrelated factors that should be taken into consideration when determining appropriate criteria for measuring energy poverty and for identifying households that suffer from its symptoms. Furthermore, the European Commission has initiated and supported financially the EU Energy Poverty Observatory in order to underpin the coordinated efforts of Member States in their joint effort to fight energy poverty.

As to the amended Directive of the European Commission on the internal market for electricity, its main objective regarding citizens’ welfare is to reduce energy services cost and thus the prevalence of energy poverty. Various ordinances have been considered to accomplish this such as the planning of a market-based tariff system with access to reliable and explicit information about energy pricing. Also, the consumers’ right to change energy suppliers should be safeguarded and at the same time low-income households should be provided with a safety net. The measures presented above are some of those which provide for the safeguarding of vulnerable consumers and for the formulation of a stable, regulatory framework which will negotiate effectively one of the main aggravating factors of energy poverty - excess energy expenditure.

Moreover, the measures introduced by the European Commission for Clean Energy, aim for forming and establishing an energy system that places consumers at its core. The active participation of consumers and further empowerment of their role in the energy market’s offer and demand chain is an essentially innovative tool that will facilitate the European Union’s transition to cleaner energy. One of the principal objectives of the European Commission is to bridge the gap between energy consumers and the energy market. The transition from the liable status of energy consumers to that of active consumers who self-generate energy to accommodate their own needs (prosumers) or store, share, exchange even sell it via Energy Communities will play a decisive role in achieving the desirable energy transition and in safeguarding consumers against the dire effects of energy poverty. Active participation in the energy system will allow consumers to monitor energy consumption closely and to respond promptly and adequately to the pricing variations. In this way energy consumers can reinvent their energy behaviour and timely intervene in the process of transitioning to cleaner energy.

⁴¹ Of a total 23.3 million households living in energy poverty according to Eurostat

2.2 ESTABLISHMENT OF THE EUROPEAN UNION'S ENERGY POVERTY OBSERVATORY

INTERVIEWS HELD WITH:

- Professor Stefan Bouzarovski, Chair of European Energy Poverty Observatory (EPOV) Steering Committee
- Marilyn Smith, EnACT project (partner of EPOV)

The EU Energy Poverty Observatory acts as a hub of information, initiatives, policies and stakeholders operating in the field and attempts to address the phenomenon of energy poverty along with its implications across Europe. It provides educational resources and links to local authorities as well as a series of networks for measuring and monitoring the problem. For the first time a comparative and detailed picture of the energy poverty “symptoms” as they manifest in each Member State of the European Union is provided. The EU Energy Poverty Observatory does not determine the most efficient tools to combat the issue since these choices depend on the adopted policy of each Member State. Its main role is to serve as a reference point to which decision-makers and activists can have access and share knowledge on energy poverty.

To this end, the Observatory can draw up strategies to combat energy poverty at pan-European level. According to Stefan Bouzarovski, academic and expert in the field, the strategies in question should include obligatory measures for all Member States of the European Union. Specifically, Member States should:

1. Measure and monitor energy poverty according to the guidelines of the European Commission.
2. Take measures to ameliorate energy efficiency, reinforce political cohesion and safeguard consumers.
3. Ensure that energy efficiency policies are socially progressive and the welfare of low-income households is a priority.
4. Provide for a comprehensive, open, democratic procedure during policy-making and consider the needs of the households that lack representation.

In line with policies on energy efficiency, Renewable Energy Sources and greenhouse gas emissions (initiative 20/20/20), the European Union's policy on energy poverty should set clear targets and objectives for effective action while taking into consideration the particular prevailing conditions in each Member State and their respective challenges. Setting clear targets and objectives based on quantifiable indicators nationwide in order to mitigate energy poverty will prove that political commitment to achieve the above is mandatory. Moreover, the European Union may oblige Member States to collect data to support the creation of a baseline for tracking and measuring progress in combating energy poverty.

Adopting a common definition of energy poverty at pan-European level under the current political situation is rather challenging. A detailed definition of such nature would not be ideal either due to the varying and particular conditions prevalent in each Member State. On the other hand, a general definition that would serve as a basis from which national definitions would be drawn up under the guidance and with the contribution of experts and stakeholders of the Commission, could be a viable solution since the European Union's definitions and the national ones serve different purposes. A national definition would have the potential to set up the framework needed to raise public awareness, to develop monitoring strategies and to implement special policy measures while its European counterpart would be generally orientated towards integrating standards and measures in the European Union's legislation.

The EU Energy Poverty Observatory is a new initiative launched by the European Commission in December 2016 and its web platform has been available since January 2018. Its main role is the implementation of policies stated in the “Clean Energy Package for all Europeans” which signifies how crucial to the European Com-

mission the safeguarding of the consumers – especially the vulnerable ones – is. That becomes even more evident when the energy market's rapid evolution is considered. At the same time, the Observatory highlights the need to immerse into the problem of energy poverty in order to prepare and develop effective strategies to combat it at pan-European, national and local levels. The data and information available on the web platform of the EU Energy Poverty Observatory do not only concern policy and decision-makers but also appeal to the public in an attempt to diffuse confusion surrounding the roots of the problem, its definition (qualitative, quantitative and geographical), the best practices and policies to combat it and finally its relation to other policies (for example, climate policy, air quality policy, public health etc.). The Observatory is an irreplaceable ally to all parties involved in combating energy poverty since it is the focal point of knowledge and data till recently scattered and disparate and very importantly it facilitates networking and enables skills development through educational resources and provision of technical assistance. It is however a 40-month project whose operations will be concluded in mid-2020 therefore its viability remains to be seen.

2.3 NATIONAL ENERGY POVERTY OBSERVATORY

INTERVIEW HELD WITH:

- Minas Iatridis, Energy Policy Analysis Department, Division of Energy Efficiency and Planning, CRES

The National Energy Poverty Observatory, an initiative co-funded by Greece and the European Union – European Regional Development Fund⁴² – was developed by the Centre for Renewable Energy Sources (CRES) in 2014. Its principal aim is to inform and raise awareness among citizens and policy-makers regarding energy poverty rates in Greece. More specifically, it has contributed to identifying the conditions that aggravate the issue and within this framework a specific methodology to assess the actual energy poverty levels in Greece has been developed. In this manner the Observatory exercises more efficient energy policy that aims for financial and social cohesion and develops policy measures to mitigate the phenomenon.

An important step towards comprehending and defining energy poverty in Greece is the methodology developed by the National Energy Poverty Observatory which assists in comprehending and assessing the prevalence of the phenomenon in the country. The particular methodology utilises data⁴³ compiled annually by the Household Budget Survey conducted by the Hellenic Statistical Authority as well as demographic characteristics data on the households, the climate conditions, the components of buildings etc. After processing the data, the households' energy needs emerge; that allows us to estimate the energy needed to meet these needs and calculate the expenditure on those.

The two basic indicators that point to the levels of energy poverty in Greece are the following:

1. The households' ability to accommodate their energy needs
2. The percentage of the income spent on accommodating these needs.

⁴² Funded by joint Action "National Information System for Measuring Energy Efficiency within the framework of Directive 2006/32", Priority 1: "Improving Productivity via RES Utilisation" run by the "Digital Convergence 2007-2013" programme.

⁴³ The national Energy Poverty Observatory's database contains data from "Households energy consumption survey 2011-2012" conducted by the Hellenic Statistical Authority. Data on the Observatory's parameters were recently updated by the CRES 31/07/2014.

The first indicator is the ratio of the actual energy consumption to the estimated energy consumption. It is called “basic energy needs coverage rate” and it can reach up to 80%. The second indicator is the ratio of the actual energy expenditure to the annual income of the household. It is called “actual energy expenditure rate” and the indicator should point 10% or higher. According to the methodology developed and applied by the National Energy Poverty Observatory, the conditions that exacerbate energy poverty are affected by aspects like region and the climate zone in which a household is located. Its size, the presence of vulnerable family members, its income, ownership status as well as the building’s age are also considered.

The rates of these indicators which are available on the National Energy Poverty Observatory’s webpage⁴⁴ depict the 2011- 2012 time period so an accurate picture of the indicators’ progress over time cannot be provided. According to the National Energy Poverty Observatory’s estimations during that period, 40% of the households had total energy needs coverage rate lower than 80% while 39.5% of the households showed total energy expenses rate higher than 10%.

Greece still lacks a formal definition for energy poverty the main cause being that so far efforts to combat it have not been organized or coordinated. Yet, policy-measures in the energy sector that concern vulnerable population groups and contribute to ameliorating this predicament are already in effect. Such measures include implementation of the “Social Electricity Tariff” scheme and special measures for safeguarding consumers such as the 40-day notice for energy bills payment or the option of partial and interest-free payment, suspension of the supplier’s right to cut-off electricity supply due to arrears on bills and lastly the heating oil allowance. At the same time, measures conducive to energy saving for vulnerable households are anticipated. Within the framework of the “Saving at Home II” programme, households with annual income lower than 20,000 euros per annum, are eligible for up to 70% subsidy for energy-saving initiatives. Finally, under the energy efficiency obligation schemes, energy market operators receive premiums for the implementation of measures that safeguard vulnerable population groups since the percentage of energy saving they are aiming at through these actions is increased by 40%.

Drawing up a National Energy Poverty Action Plan, an effort supported by CRES, is expected to underpin the role of the National Energy Poverty Observatory by enriching and updating information pertinent to energy poverty along with the corresponding data to compute indicators for quantifying the repercussions of energy poverty. This will ease and strengthen future collaboration between the National Energy Poverty Observatory and the EU Energy Poverty Observatory in a way that the two parties will complement one another and will exchange views and expertise. It is worth mentioning at this point that the CRES which developed the National Energy Poverty Observatory is part of the consortium responsible for the development of the EU Energy Poverty Observatory.

The National Energy Poverty Action Plan will include a definition for the energy poor household; it will define the mechanisms to quantify and measure the phenomenon of energy poverty at national and regional levels and will designate targeted actions to ameliorate it. These actions include favourable tariffs, allowances, energy audits as well as informative and educational activities. Moreover, the Plan will anticipate favourable conditions for energy upgrade subsidies, will promote measures to relieve vulnerable households within the obligatory schemes framework, will advocate establishment of Energy Communities for energy poverty tackling purposes etc.

⁴⁴ National Energy Poverty Observatory’s webpage. Available on: <http://bit.ly/energypoverty-44>

The National Energy Poverty Observatory was developed by the Centre for Renewable Energy Sources (CRES) during Greece's deep financial recession. The timing was well received since it gave quantitative evidence for the surge of the issue and its association with the recession's repercussions on citizens' income and with the excess energy costs due to over-taxation. The outcomes of the data analysis during 2011-2012 that was based on the methodology adopted by the National Energy Poverty Observatory, coincide with the appearance of black carbon smog during the winter of 2012 in big urban centres since a large part of the population made the shift from central heating systems to the burning of unsuitable materials to secure heating in the residencies.

PERIOD	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014
Decrease in the use of central heating	2.5%	0.4%	1%	22.6%	32%	2.6%

Hellenic Statistical Authority, Source: <https://bit.ly/3gXRH3K>

Sadly, following the completion of the Operational Programme "Digital Convergence 2007-2013" which included it, the National Energy Poverty Observatory's database has not been updated making the initiative appear inactive. Tracking energy poverty progress therefore has not been possible for the past few years. However, the developed methodology constitutes an important legacy which may prove valuable for forming and phrasing an energy poverty national definition and for drafting a National Energy Poverty Action Plan.

Underpinning the role of the National Energy Poverty Observatory (e.g. establishing it as an independent body, securing sustainable funding, staffing etc.) and strengthening its collaboration with its European counterpart can be recognized as a significant step towards combating energy poverty in Greece. At the same time its policies are in line with national energy and climate policies and it monitors targets and objectives set by the National Energy and Climate Plan. With the aim of safeguarding citizens, the quantitative target is to reduce the indicators' rate of energy poverty by 50% by the year 2025 and by 75% by 2030. It should be pointed out that Greece is the first country in Europe to set such ambitious quantitative targets in its National Energy and Climate Plan⁴⁵.

In line with the operations of EPOV, the National Energy Poverty Observatory has the potential to facilitate networking and come to be focal point of information sharing and exchange among stakeholders and bodies involved in the field by compiling, dissipating and multiplying knowledge on energy poverty. Furthermore, it could assume a consultative role and provide information and guidance to bodies, authorities or their consortiums in order to put together comprehensive action plans funded by the European Commission. These strategies and action plans should be marked by social innovation in the fields of energy saving and community energy and it would be recommended that allowance measures be avoided.

⁴⁵ Right to Energy Coalition (May 2019): Keeping the lights on: Which EU countries are taking action on energy poverty? Available on: <http://bit.ly/energypoverty-45>

2.4 STATUTE FOR ENERGY COMMUNITIES

INTERVIEWS HELD WITH:

- Markos Damasiotis, Division of Development Programmes, CRES
- Dimitra Barkouta, Division of Development Programmes, CRES
- Takis Grigoriou, Campaign Manager on Energy and Climate Change, Greenpeace Greece

Accepting the inevitability of climate change and the entailed policy framework for curbing its effects gave birth to the necessity (and priority) for energy transition. Within this framework Greece sets targets for a shift towards a low carbon dioxide emissions economy under the principles of European Directives and the Paris Agreement. The targets included in the revised National Energy and Climate Plan, are:

- Saving energy so as the final energy consumption does not exceed 18.1 Mtoe in 2030.
- Decreasing emissions for all sectors with the exception of the emissions trading system by at least 16% compared to 2005 rates so that they do not exceed the 54 MtCO₂eq.
- Decreasing emissions in all sectors with the exception of the emissions trading system by at least 43% compared to 2005 rates so that they do not exceed the 41 MtCO₂eq.
- Achieving 13% plus contribution to the gross final energy consumption of the Renewable Energy Sources in 2030 and 53% contribution to the gross electricity consumption.

These targets are deemed ambitious since for the past decade Greece has been experiencing the deepest financial recession in its recent history and has to bear the heavy burden of energy intensity, cost and dependence, as demonstrated by the fact that even during recession the Greek economy consumed 25 million Mtoe, 80% of this energy coming from fossil fuels and 80% of which was imported. At the same time though, these targets constitute a window of opportunity for “democratising” the energy system, for strengthening energy democracy and for advocating energy justice.

Democratising the energy sector presupposes a socially just transition that will secure equal participation for all and mainly for vulnerable citizens who find themselves in a predicament. It is hoped that the transition will remedy ailments of the current fossil fuel-based energy system – energy poverty, high rates of unemployment in lignite regions and increasing threats to citizens’ health and wellbeing to name but a few. These remedies are deemed achievable because renewable and clean energy sources along with energy-saving technologies are distinguished by their dynamic’s locality; they enable decentralisation of the necessary infrastructure, they engage local communities and boost local employment as vacancies in construction, in administration and in maintenance come up. These actions have the potential to contribute significantly to rapid de-carbonisation of the economy and inspire sustainable local entrepreneurship.

The Energy Communities’ legislation (Law 4513/2018 of the Greek Parliament) provides for strengthening energy democracy by placing citizens, local municipal authorities and mid-sized businesses at the heart of the energy transition from traditional fuel energy to clean energy sources. Under this new regulatory framework and through democratic decision-making, citizens also make the transition from energy consumers to energy producers (self-generation) via social consensuses and synergies. Equal participation of the interested parties in the decision-making is provided for and each member is entitled to one vote regardless of their share in the cooperative (Art.3).

Locality is a key-element in the energy communities’ legislation (Law 4513/2018 of the Greek Parliament) so that energy ventures may satisfy local needs by using local renewable energy sources and also capitalise

on energy saving opportunities. The Law also takes into account the geographical particularities of the islands and provides more favourably for islands with population smaller than 3,100 residents. Finally it includes financial incentives and support measures to endorse and facilitate the operation of Energy Communities and anticipates the creation of Unions – Energy Communities Confederacies.

The first article of the law in question refers to the role of Energy Communities in addressing energy poverty. In order to achieve this target it provides Energy Communities with two available tools; net metering and virtual net metering. Via virtual net metering vulnerable household can be provided with free solar power even if they are not members of an Energy Community. By Ministerial Order relatively simple procedures are to be followed in order to inform the provider about the new beneficiaries and energy recipients. In general, the statute:

- Specifies objectives and activities of an Energy Community such as its capacity to act in support of vulnerable consumers and to combat energy poverty for citizens who live below the official poverty line in the region where the Community is established even if these citizens are not members of the Community. Support as such may take the form of energy provision or net metering, upgrading residencies' energy-efficiency or other actions orientated towards reducing energy consumption in the residencies in question.
- Amidst financial incentives and support measures for the Energy Communities, it anticipates installation of Renewable Energy Sources and Cogeneration of High Performance Heat and Power (RES and CHP) plants as well as Hybrid Plants to accommodate the needs of Energy Communities' members and of vulnerable consumers living below the official poverty line in the region where the Community is based via application of virtual net metering (Art.11, par.10).
- It raises the limit of net metering from 500 kW to 1 MW for the RES and CHP plants (Art.3, subpar. c).

Legislation is the first step towards establishing Energy Communities as reliable collectives, equal to their predecessors which operate in the energy sector as it is already happening in other countries. To materialise this vision it is mandatory that we capitalise on the possibilities offered by the new statute effectively and efficiently. Although cooperatives have not always been successful in Greece and certain reluctance might be detected in accepting the cooperative philosophy, the particular legislation bridges many gaps in the internal energy sector and has the potential to persuade local stakeholders and communities to actively engage in the energy transition. According to a study conducted by Greenpeace in 2016⁴⁶, more than 700 MW photovoltaics of the Energy Communities could be installed in the country by 2030 which is translated into 230,000 citizens becoming involved in the effort.

The recorded trends are encouraging since immediately after the energy communities legislation was introduced and established by the Law 4513/2018 of the Greek Parliament, many interested parties all over the country expressed interest for establishing Energy Communities. The next steps to be taken by the Energy Communities should be considered carefully and their operational plans designed with caution so that success will be guaranteed. Admittedly, Energy Communities adhering to the seven basic principles of cooperatives prove to be the most vital element of society's collective and active participation in the socially just energy transition.

⁴⁶ CE Delft (September 2016): The potential of energy citizens in the European Union. Available on: <http://bit.ly/energypoverty-46>

The enactment of the Law 4513/2018 of the Greek Parliament on Energy Communities is undoubtedly a decisive step towards a more democratic, decentralised energy system which increasingly utilises Renewable Energy Sources and energy saving technologies. The stipulations of the particular Law have received criticism on the grounds of geographical restrictions and their implications on the Communities future growth and sustainability. Whether the criticism is justified will be witnessed on the aftermath of the project's application. Another controversial point is natural gas utilisation for performing operations and implementing plans something that does not fully agree with the philosophy guiding Energy Cooperatives because of the gas extraction's impact on the environment and the fact that it does not contribute to the country's energy safety nor reduces import rates.

As to the role of Energy Communities in addressing energy poverty, the target-setting of the Communities and the opportunities offered to stakeholders for an alternative social policy and for the utilisation of virtual net metering are explicitly mentioned in the statute. Recognition of their contribution to the safeguarding and empowering of consumers through adopting a quantitative target for the implementation of collaborative RES projects as stated in the National Energy and Climate Plan is equally encouraging.

Energy Communities can indeed constitute a valuable tool for achieving affordable clean energy supply, for energy saving and for sensible energy use that will consequently reduce energy costs and indirectly –or even directly–create vacancies that will drive local growth and boost disposable income.

Given the short time that has elapsed since the recent implementation of the Law and our limited experience, it is wise to remain sceptical as to its actual impact on combating energy poverty. In any case, it is essential that all parties subject to the Law (citizens, municipal bodies, the media etc.), the parties engaged in the project and the supporting agents (network administrator, credit institutes, agents of the Social and Solidarity –based Economy etc.) receive the necessary training and updating to alert them on their future role in the country's energy sector, the particularities of the sector and apparently the need to strike the right balance between sustainable entrepreneurship and required loyalty to the principles of the cooperative movement⁴⁷.

2.5 “SAVING AT HOME II” PROGRAMME

After the completion of the “Saving at Home I” programme that ran since 2007 until 2013, the Ministry of Environment and Energy introduced the programme “Saving at Home II” in March 2018. Shortly afterwards, in June 2019, the inception of the second phase of the “Saving at Home II” programme was announced after the budget of the first phase was exhausted sooner than expected. The particular programme constitutes the only national financial aid programme aiming at increasing the **building stock's** energy performance. Its central focus lies on providing incentives for energy upgrade interventions in residencies (flats, blocks of flats

⁴⁷ CommonsLab (October 2018): Questionnaire on Cooperative Principles, webpage. Available on: <http://bit.ly/energypoverty-47>

and houses) of legal status on condition that owners meet the income eligibility criteria and energy efficiency-wise fall into Category D or below. Furthermore, the programme aspires to increase energy saving nationwide, to reduce carbon dioxide emissions, to upgrade the urban landscape, to amend living conditions in the residencies and to achieve some extra benefits like energy security, creating employment opportunities, combating energy poverty and curbing its detrimental effects on citizens' health and wellbeing.

The "Saving at Home I" programme was criticised mainly on the grounds of its rampant bureaucracy. Also, due to the fact that it attributed a central role to the credit institutes and thus impeded the participation of financially vulnerable households of low credit ratings and finally because of the rather complicated procedure preceding involvement of housing blocks in the programme although such interventions would greatly boost their energy-efficiency. The first phase of the "Saving at Home II" programme proclaimed changes that would remedy these flaws such as investing own funds, online applications for inclusion in the programme via a designated platform and expanding the income eligibility criteria as illustrated in the table that follows (Table 2). Lastly, the energy saving target set in its framework was rated according to the income category; annual primary energy saving was expected to be higher than 40% of the energy consumption (kWh/m²) of the reference building for categories 1 and 2 and correspondingly, 70% for the rest.

TABLE 2: Comparing income brackets and subsidy rates between "Saving at Home I" programme and "Saving at Home II" programme.

"SAVING AT HOME I"			
INCOME BRACKETS	INDIVIDUAL INCOME(€)	FAMILY INCOME(€)	SUBSIDY
Category A	Up to 22,000	Up to 40,000	30% subsidy plus interest free loan for the remaining 70%
Category B	22,000-40,000	40,000-60,000	15% subsidy plus interest-free loan for the remaining 85%
Category C	40,000-60,000	60,000-75,000	Low-interest loan
"SAVING AT HOME II"			
INCOME BRACKETS	INDIVIDUAL INCOME(€)	FAMILY INCOME(€)	SUBSIDY *
Category 1	Up to 10,000	Up to 20,000	60% subsidy plus own capital or interest-free loan for the 40%
Category 2	10,000-15,000	20,000-25,000	50% subsidy plus own capital or interest-free loan for the 50%
Category 3	15,000-20,000	25,000-30,000	40% subsidy plus own capital or interest-free loan for the 60%

Category 4	20,000-25,000	30,000-35,000	35% subsidy plus own capital or interest-free loan for the 65%
Category 5	25,000-30,000	35,000-40,000	30% subsidy plus own capital or interest-free loan for the 70%
Category 6	30,000-35,000	40,000-45,000	25% subsidy plus own capital or interest-free loan for the 75%
Category 7	Higher than 35,000	Higher than 45,000	Interest-free loan

* incremented by 5% for every child and up to two children

According to Mr. Michalis Verroioopoulos, Former General Secretary for Energy and Mineral Resources, about 43,000 residencies were upgraded to a more energy-efficient status through the funding provided during the first phase of the “Saving at Home II” programme⁴⁸. Since March 2018 and by the end of that year, 43,837 final applications were registered in the system and 39,793 of them were admitted. The majority of those applications consisted of households falling into category 1 with annual family income up to 20,000 euros and their residence falling into the lowest energy category H⁴⁹. These data are deemed positive as they highlight the intended social appeal of the programme and illustrate its impact on enhancing living conditions for low-income households and on sheltering them from energy poverty.

Up to a certain degree, the programme’s plan seems to take into consideration the citizens’ declining income – outcome of the austerity policies that were in effect during the recession. According to the Independent Authority of Public Revenue (IAPR), in 2017, 58.9% of tax-payers registered family income lower than 10,000 euros – let it be noted though that tax evasion is occasionally a possibility. In addition, the data show that 4 out of 10 households live on less than 416 euros per month⁵⁰. It thus becomes apparent that energy poor households, even in ownership status, are excluded from the programme and its benefits because they lack own capital.

The overall objective and strategies on the anticipated benefits of energy saving were received with scepticism and deemed unambitious. According to the Buildings Energy Efficiency Regulation, the outcome of an obligatory energy-efficiency upgrade by at least one category lags behind in comparison with the outcome deriving from “near-zero energy buildings”. According to data published by the Greek Ministry of Environment and Energy⁵¹, 73% of the aforementioned applications concern flats and the proposed budgeted interventions focus on frames and window glass replacement(38%), insulation (3%), upgrade of heating and cooling

⁴⁸ B2Green (July 2019). Re-starting the “Saving at Home” programme without income criteria seems likely. Available on: <http://bit.ly/energypoverty-48>

⁴⁹ Ecopress (February 2019): New “Saving at Home” programme: how the funds re allocated. Available on: <http://bit.ly/energypoverty-49>

⁵⁰ Bankingnews.gr (March 2019): Income tax returns 2018: 40% of households live on 416euros/month – Income shrinks dramatically. Available on: <http://bit.ly/energypoverty-50>

⁵¹ Ecopress.gr (July 2018): “Saving at Home”: 73% of applications concerns single flats. Available on: <http://bit.ly/energypoverty-51>

systems (26%) and upgrade of domestic hot water provision systems (5%). The data illustrate several upgrades for energy-efficiency but they still do not reach high levels of energy saving. According to criticism drawn by the Greek Architects Union, the scheme seems to be particularly concerned with boosting the market therefore the essence of these interventions is degraded since subsidies are provided without reckoning the energy advantage they confer⁵².

Given the fact that combating energy poverty is a clear objective in the National Energy and Climate Plan accompanied by a specific quantitative target⁵³, the drafting of a specialised programme for upgrading buildings' energy efficiency is deemed necessary. The proposed programme should accommodate the needs of households that do not fall into one of the subsidy eligibility income brackets and are thus excluded from the current schemes. Special care should also be provided for large families and single-parent families – especially female single-parent families since this is also a gendered problem with women being affected the most and thus left more vulnerable to poverty⁵⁴ and by extension to energy poverty. In order to effectively safeguard citizens from energy poverty we should promote a “deep” energy efficiency upgrade of residences and subsidise the implementation of RES technologies. The project iBRoad – Individual Building Renovation Roadmaps is on course to this radical renovation scheme (see section 4.3).

2.6 MARKET-BASED INSTRUMENTS

INTERVIEWS HELD WITH:

- Christos Tourkolias, Energy Policy Analysis Department, CRES
- Nikos Gkonis, former Senior Energy Efficiency Expert, GIZ

The Market-Based Instruments (MBIs) are policy measures whose purpose is dynamic development of the energy services market along with effective accomplishment of targets aiming to improve energy efficiency at national level and minimize the possibility that added costs burden the consumers. Through market-based instruments, fuel and energy service providers, electricity suppliers etc. - by their own initiative or by obligation, integrate energy saving measures and actions into their company strategy. As these market-based instruments focus on achieving a specific outcome (e.g. energy saving goals, cost efficiency) without specifying the measures to be put into effect, they attribute a certain flexibility to market operators and assign to them the task of coming up with innovative solutions and ways to increase their competitiveness.

The energy efficiency obligation schemes are the most common and effective market-based instruments. Several countries around the world and across Europe like the United Kingdom, Italy, France and Denmark have already adopted such schemes. Indicative of this is the fact that 40% of the energy saving goal in the European Union is expected to be reached via these schemes by 2020. It is important to mention that obligated parties occur only in the energy efficiency obligation schemes and not in every market-based instrument. In Greece, the energy efficiency obligation schemes as described in the Law 4342/2015⁵⁵ of the Greek Parliament constitute the first and only active market-based instrument in the energy saving sector to date. The particular

⁵² Greek Architects Union (July 2019): Intervention in the new phase of the “Saving at Home” programme. Available on: <http://bit.ly/energypoverty-52>

⁵³ The National Energy and Climate Plan's milestone is to reduce by at least 50% the energy poverty indicators by the year 2025. By 2030 this percentage is to be reduced by 75% compared to its equivalent in 2016

⁵⁴ “TA NEA” (newspaper article August 2018): Poverty “attacks” mostly women. Available on: <http://bit.ly/energypoverty-54>

instruments are in effect for the period between 2017 and 2020 and during the preparatory stage of the National Energy and Climate Plan 2030 the energy efficiency obligation schemes are expected to play a vital role in reaching the national energy saving goal for the time period between 2012 and 2030.

The benefits for the obligated parties as they derive from the energy efficiency obligation schemes framework pivot on:

1. Actively involving energy businesses in the energy service market so that they undergo radical structural transformation, adopt a new role and diversify their duties.
2. Offering high-quality energy services that presuppose a new solid collaboration between energy businesses and final consumers.
3. Conferring the opportunity to the obligated parties to attract new clients or extend the contracts of the current ones on condition that they provide competitive cost efficient interventions that will ultimately lead to establishing long-term relations of trust with the consumers who participate in the energy saving plan.

Regarding the targets of the current period (2017-2020) it is estimated that by 2020 the obligated parties will have managed to comply with the energy saving obligations. Judging by the instruments' implementation during the first year of their adoption, it is quite likely to even exceed this target. The targeted total end-use energy savings in 2017-2020⁵⁶ is 333 ktoe which apportioned in yearly cumulative targets shows as: 100ktoe for 2017, 133 ktoe for 2018, 67 ktoe for 2019 and 33 ktoe for 2020. The cumulative energy saving units achieved in 2017⁵⁷ were 278 ktoe and this deviation is deemed positive when compared to the 100 ktoe target for the reference year 2017. During 2017, more than half of the energy saving units achieved by the obligated parties were solely the outcome of behaviour measures whose objective was the shift towards more sensible energy consumption. Finally, the necessitated familiarisation of the involved parties with the scheme's technical demands is believed to have been accomplished while the instrument's effective planning for the period between 2021 and 2030 constitutes a great challenge if perfecting its efficiency is an objective.

The energy efficiency obligation schemes framework contains provisions for addressing energy poverty. The Article 7 of the Regulation for Energy Efficiency Obligation Schemes for the period between 2017 and 2020 anticipates that the energy saved by the implementation and adoption of technical and/or behaviour measures is supplied as premium to energy vulnerable households with a 1.4 multiplier.

The need to reinforce the particular provision for the period between 2021 and 2030 cannot be stressed enough. It is also expected that the National Energy Poverty Action Plan will include a definition of the energy vulnerable households in aid of those affected by energy poverty.

It is estimated that the aforementioned measures will raise public awareness on energy saving and will contribute to curtailing energy poverty in Greece. Few awareness campaigns revolving around energy vulnerable households have taken place to date. A shift in mentality and behaviour of consumers carries the potential to combat energy poverty and put an end to unintended energy waste.

⁵⁵ TaxHeaven (2015): law 4342/2015, Art. 9 (Greek Government Gazette 143/A/9-11-2015) Integrating into Greek Legislation the Directive by the European Parliament and the European Council on the 25th October 2012 on energy efficiency. Available on: <http://bit.ly/energypoverity-55>

⁵⁶ TaxHeaven (2017) Ministerial Order No 174063 (Government Gazette B, 1242, 11/04/2017). Regulations on Energy Efficiency Obligation Schemes Operation. Available on: <http://bit.ly/energypoverity-56>

⁵⁷ e-nomothesia.gr (2018) Ministerial Order No ΔΕΠΕΑ/Γ/175706 (on Energy Performance Certificates). Energy service companies. Available on: <http://bit.ly/energypoverity-57>

The market-based instruments are policy measures inviting market operators to adopt a more engaging role in the energy transition and place energy saving at the core of this shift. They transform energy products and the energy services market by shifting market operators' and consumers' focus from energy consumption to sensible energy consumption and energy saving. At the same time they encourage or oblige (depending on their nature) market operators to use own capital to meet national energy efficiency targets while consumers are safeguarded and not burdened with added costs. The conclusions reached following implementation of the energy efficiency obligation schemes allow us to be optimistic about the obligated parties meeting the targeted energy saving levels. Another encouraging fact is that a respectable range of agents who traditionally engage in electricity, oil and natural gas supply, have become involved in the scheme. Obviously there is room for improvement and the range of parties involved can widen even more so as to include certified installers, technicians etc.

Given that energy efficiency obligation schemes implementation is short-lived, it makes sense to currently shift the emphasis on encouraging interventions in consumers' behaviour. That is in line with the European agenda which cedes priority to informing and training citizens so that they can make informed decisions about further energy saving measures. In Denmark, where energy efficiency obligation schemes have been in effect for the past 20 years, the goal gradually shifted from refining skills and acquiring knowledge to materialising specific cost-efficient projects and registering energy saved⁵⁸. Added key-factors in the future of energy efficiency obligation schemes include defining the additionality of the interventions⁵⁹, shaping a framework to ascertain that projects that have already been carried out could not have materialised otherwise (e.g. without consultation or subsidy or both) and creating simple less bureaucratic procedures for the obligated parties to follow.

It should be highlighted that active participation in the market-based instruments could entail an added bonus for fuel providers, energy service and electricity suppliers etc. since energy saving augments citizens' disposable income. As a result, bills are promptly paid, default payments are less and cash flow problems for energy or electricity suppliers are avoided. Several studies and pilot programmes prove that the interventions anticipated in this policy framework (behaviour measures, installing monitoring tools to measure consumption, upgrading equipment and building shells etc.) constitute the most effective and sustainable answer to rising costs which all citizens – not excluding vulnerable households - have to bear. Unlike allowance policies that condemn citizens to never-ending energy poverty, the measures pointed out above can contribute to directly decreasing bills and indirectly augmenting citizens' disposable income.

It is worth mentioning that European energy cooperatives voluntarily invest in awareness campaigns and instruction for the benefit of their members and clients in a way similar to that of traditional market operators of the energy efficiency obligation schemes. The RESCoop Plus initiative⁶⁰ focuses on the impact that the promotion of energy saving measures has on the en-

⁵⁸ ENSPOL Project (March 2015): D2.1.1: Report on existing and planned EEOs in the EU– Part I: Evaluation of existing schemes. Available on: <https://bit.ly/3i71LHT>

⁵⁹ Stockholm Environment Institute & Greenhouse Gas Management Institute (November 2019), Securing Climate Benefit: A Guide to Using Carbon Offsets. Available on: <https://bit.ly/2HEugjy>

⁶⁰ REScoop Plus. Available on: <http://bit.ly/energypoverty-60>

ergy cooperatives' growth and on the refinement of their members' energy behaviour. At the same time, it puts forward the most efficient practices available for current or prospective energy cooperatives wishing to be involved in clean electricity supply. Although it might appear contradictory, promoting energy saving actually derives from the alternative economic model that cooperatives advocate which does not pursue maximum financial profit but rather seeks to accommodate the needs of its members and the community in a democratic, environmental-friendly way. Instructing members and consumers on sensible energy consumption and energy saving is based on the 5th Principle of Cooperatives which commits members to continuous learning, education and training so that they may manage to diversify their roles and grow beyond the status of the passive consumer. At the same time, it agrees with commitment to natural resources efficient management and with the notion that electricity is a public good. Therefore, reducing electricity consumption is translated into more electricity from a single RES installation for more citizens.

3. ENERGY POVERTY AWARENESS AMONG RESIDENTS IN GREECE

Since July and until October 2018 the INZEB in collaboration with the Heinrich Böll Stiftung conducted a survey to assess energy poverty awareness among citizens living in Greece. The survey aimed towards identifying challenges, citizens' needs and their priorities in order to effectively address energy poverty nationwide. Part of these findings is presented here while the overall report containing the findings of the study will be available in a separate publication.

The quantitative and qualitative survey, in which 691 households participated⁶¹, was conducted online or via phone interviews and was divided into 4 modules:

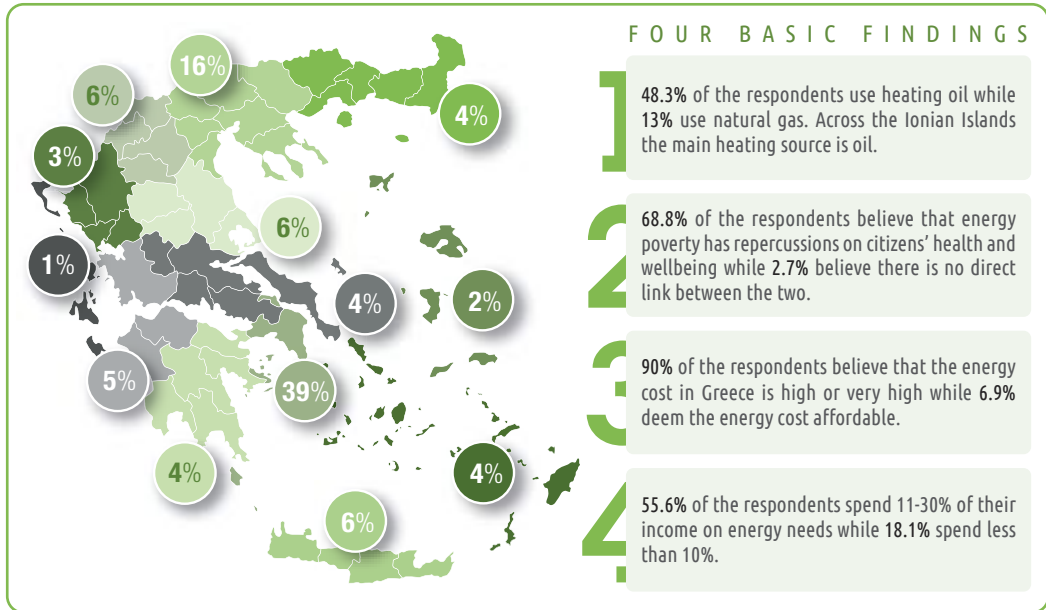
1. Demographics
2. Questions regarding technical-financial information
3. Questions regarding citizens' familiarisation with the energy poverty phenomenon
4. Citizens' opinion on tackling the phenomenon and their intention to participate in the process

Particular emphasis was laid on registering responses and opinions across the country while attempts were made to retain the representative sample of each periphery in proportion to the overall population. For instance, the findings gathered in the Attica region equate to **39%** of the overall responses while according to the 2011 population census⁶² **35%** of the overall population resides in Attica. Correspondingly, findings from central Macedonia equate to **16%** of the overall responses while **17.4%** of the overall population resides in the region. The same process was applied nation-wide (Diagram 1).

⁶¹ The phone interviews took place in cooperation with QedMarketResearch, Market and Social Research Institute.

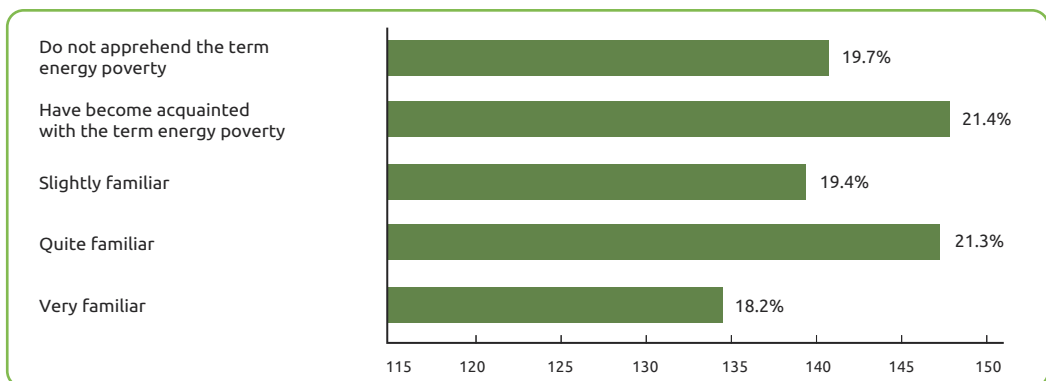
⁶² Hellenic Statistical Authority. 2011 Population and Housing General Censuses.
Available on: <http://bit.ly/energypovetry-62>

DIAGRAM 1: Response allocation by region



The findings reached by responses to three questions included in the second and third modules are interesting. Regarding the third question (extent of familiarisation with the term *energy poverty*) approximately 20% of the population residing in Greece –meaning 1 out of 5 citizens– are unaware of the term. On the other hand, 80% of the population have become familiar with the term via the Internet, the media or discussions that have taken place in their social or work environment. **39.5% of the survey participants consider themselves to be quite or very familiar with the concept of energy poverty** (Diagram 2).

DIAGRAM 2: Familiarisation with the energy poverty phenomenon



It has been observed that the phenomenon of energy poverty is intrinsically linked to buildings' structure. Most studies reveal a direct link between the phenomenon's high intensity and the buildings' inadequate energy performance. The aforementioned connection is discussed at length in the section 4.3 *Increasing Buildings' Energy Efficiency*. To the survey question regarding Energy Performance Certificates (EPCs) **56.2% replied that they did not possess an EPC** therefore access to the energy classification of the buildings was denied and data on households' energy behaviour were obscured. 23.15% possessed an EPC while 39.3% of those residencies were classified as energy class A+ or energy class B. Concurrently, 17% of owners or leaseholders whose residencies were classified as either energy class A or energy class B, mentioned that they frequently or very frequently experienced heating comfort and cooling issues throughout the year irrespective of the high energy performance classification of their residence. They attributed these problems to low-quality frames, inadequate insulation of the top floor and excess summer heat combined with high humidity levels in the region.

DIAGRAM 3: Responses regarding residencies' EPCs

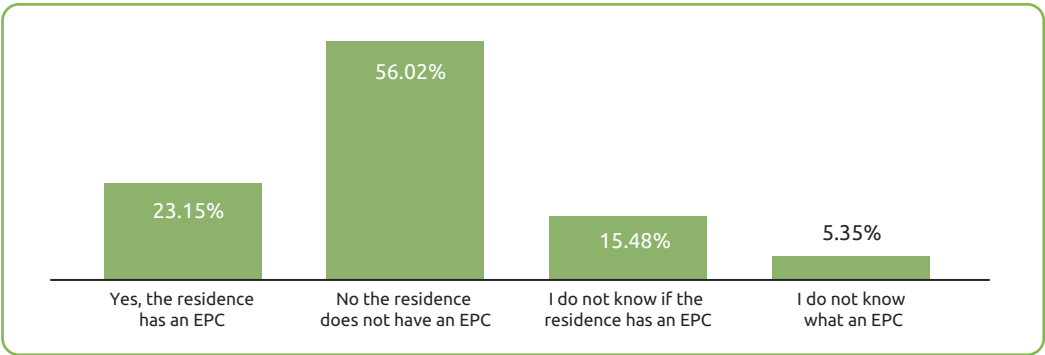
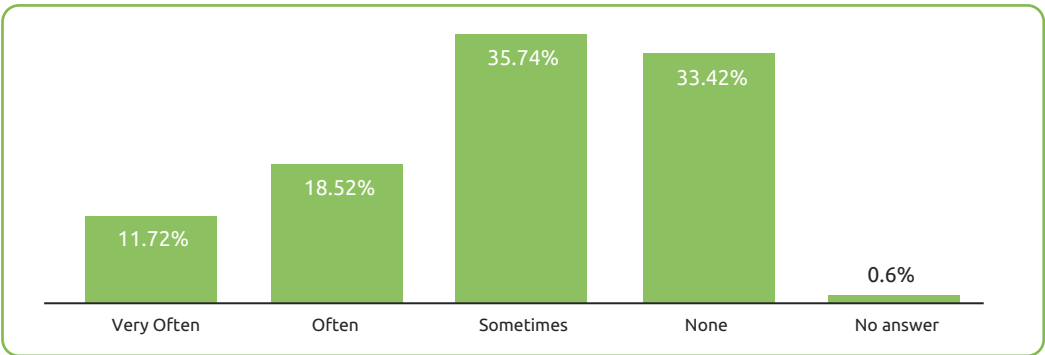


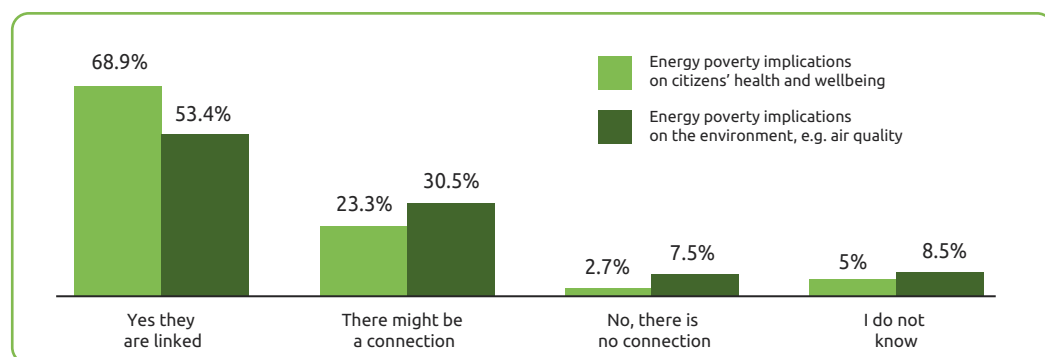
DIAGRAM 4: Responses regarding heating comfort and wellbeing within the residence



In relation to thermal comfort felt in the residencies and wellbeing, **30.2% replied that they frequently or very frequently experienced heating or cooling discomfort**; the main causes being the unaffordable heating oil cost and the tight family budget on energy services due to heating oil and electricity high costs. Complementary to these, poor preservation state of the residence summed up in lack of insulation and/or low quality frames as well as systems' inadequate maintenance, (e.g. boilers or air-conditioning) are cited as causes. The highest rate - 47% - of citizens who experienced heating and cooling discomfort relied on heating oil, while 32% on electricity for heating and cooling and a mere 1% did not rely on any heating or cooling source. 50.8% spent 11-30% of the family budget on such services while 58% of the residencies did not possess an EPC. Finally, 33.4% stated that they experience no discomfort throughout the year (Diagram 4).

Correlation between energy poverty along with its implications, air quality in urban landscapes and residents' health has been the scope of many scientific studies. In a comparative study across 32 Member States of the European Union that was published in 2017⁶³ it is stated that percentages rating poor physical and mental health are higher among energy poor populations in comparison with the rest households. In the respective survey conducted in Greece, **53.4% believed that energy poverty and urban air quality are linked** while only 7.5% disputed the connection. **68.9% believed energy poverty and residents' health to be strongly connected** while 2.7% were sceptical as to any such connection (Diagram 5).

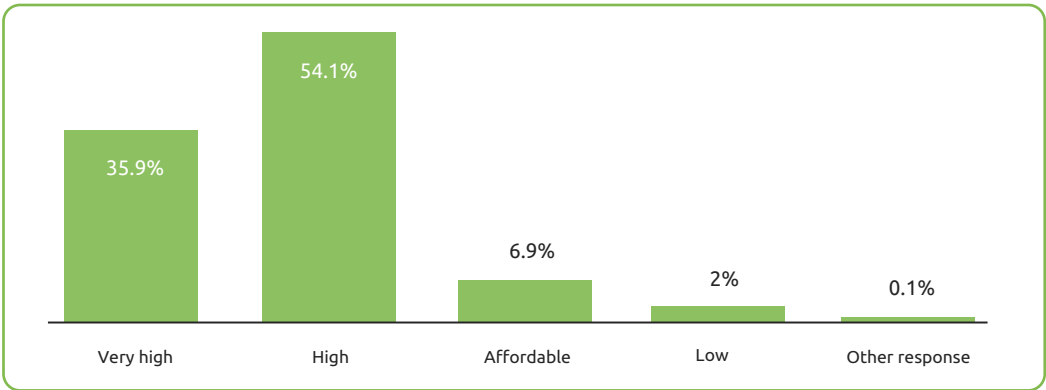
DIAGRAM 5: Responses regarding the correlation between energy poverty, air quality and citizens' health and wellbeing



Regarding the cost of the provided energy services, the majority of the survey respondents – 90% - deemed the energy cost high or very high (Diagram 6). **36.5% of this majority stated that arrears in their energy bills occurred frequently or very frequently** during the past 24 months.

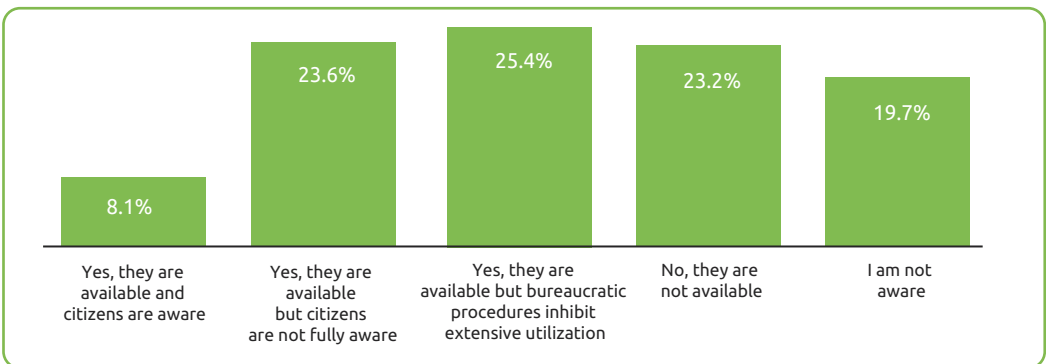
⁶³ MDPI (June 2017): Health, Well-Being and Energy Poverty in Europe: A Comparative Study of 32 European Countries. Available on: <http://bit.ly/energypoverty-63>

DIAGRAM 6: Responses regarding the energy cost in Greece in relation to the respondents' monthly/yearly income



The energy efficiency programmes “Saving at Home I” and “Saving at Home II” combined with the “Social Electricity Tariff”⁶⁴ - a subsidy aiming to safeguard vulnerable consumers - were not implemented with the goal of resolving the energy poverty problem; rather indirectly they act as drivers towards policy-making. **Concerning the question about available financial programmes and incentives that could aid energy poverty tackling, 23.2% replied firmly that such programmes were not available, 19.7% were not aware** whether they were available and **25.4% admitted knowledge of their availability but also bureaucratic impediments to their utilization** (Diagram 7). 57.1% referred to the “Social Electricity Tariff”, the heating oil allowance and the “Saving at Home” programme as supportive tools in addressing energy poverty. The particular findings demand for actions and measures. Targeted buildings’ energy upgrade programmes for vulnerable/poor citizens, wider and more inclusive dissemination of information on energy poverty and curtailing bureaucratic procedures can also be confirmed as effective.

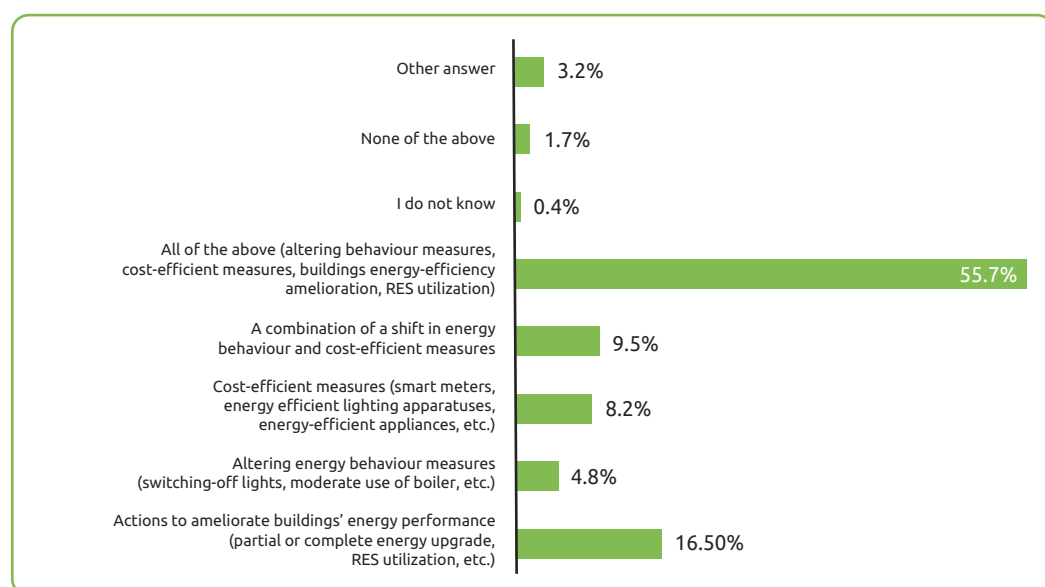
DIAGRAM 7: Responses regarding citizens' awareness of the availability of financial programmes/incentives for energy poverty tackling



⁶⁴ Public power Corporation (September 2010): Social Electricity Tariff. Available on: <http://bit.ly/energypoverty-64>

The concept of energy poverty may not yet be profoundly grasped by citizens and thus its aggravating causes and the factors may still remain inconspicuous, however citizens are perceptive as to the possible causes. **To the question regarding implementation of effective measures to tackle energy poverty 55.7% replied that an action package which will include measures on altering citizens' behaviour, cost-efficient measures** (like the installation of smart meters, the use of energy efficient lighting apparatuses, energy-efficient appliances etc.) **and buildings' energy performance amelioration measures** (like partial or complete energy upgrade, RES utilization etc.) **would prove most effective in energy poverty mitigation** (Diagram 8).

DIAGRAM 8: Responses regarding the most efficient energy poverty tackling measures



24.8% of survey participants replied that they would trust a local authority to act as a focal point for advice and consultation on mitigating the phenomenon of energy poverty, **16%** would put their trust in a **potential consumers union** and **14.6%** in an **energy cooperative**. In addition, **63%** of respondents would welcome free advice on ways to curb the phenomenon and guidance on reducing energy consumption. Finally, **47.5%** of respondents are willing to contribute to forums and collective actions towards mitigating the effects of energy poverty in their neighbourhood and their city of residence.

BASIC FINDINGS

A multidisciplinary approach on interpreting the survey participants' responses reveals the extent of energy poverty in Greece and the symptoms of its prevalence. In addition, certain conclusions can be drawn that can be translated into proposals and measures to address the issue:

- Approximately half of the participants' residencies did not possess an EPC. Beyond the apparent lack of data on the energy characteristics of the building stock, this fact also implies lost energy saving opportunities, especially since it is highly probable that the owners of these residencies have not proceeded to any energy renovation to date and conditions in these residencies remain sub-standard.
- 90% of participants deemed the energy cost in Greece as high or very high while 55.6% disclosed that 11%-30% of their income is spent on energy needs. 48.3% relied on heating oil to reach thermal comfort in their residencies with oil being the only heating source on islands. Promoting RES electricity generation is likely to decrease energy cost significantly via reduced demand for oil and other fossil fuel imports and to decrease electricity cost by applying cost-sharing techniques via utility services for all island residents.
- 20% admitted that they are not familiar with the term *energy poverty* while 4 out of 5 citizens had in some way or another become acquainted with it. 68.9% believed that energy poverty has repercussions on citizens' health and wellbeing while 53.4% connected the issue to air quality in urban regions. The conclusions noted above are encouraging as regards citizens' familiarisation with the issue of energy poverty and especially its multifaceted nature and multiple repercussions – though inconspicuous at first glance - on citizens' health and wellbeing and on the environment. Complementary to that 55.7% of the survey participants proposed combined measures (shift in energy habits, use of smart, efficient appliances, amelioration of buildings' energy performance, RES utilization etc.) for effective combating of energy poverty.

The proposed policies discussed in the following section aim towards radically transforming the picture depicting energy poverty and its implications on citizens' daily lives. In addition, the particular policies stress the urgency to tackle the issue through strategies and measures characterised by sustainable social innovation, pre-suppose closer collaboration between stakeholders, set long-term targets and most importantly, transfer citizens from the passive status of the recipient to the heart of developments and resolutions.

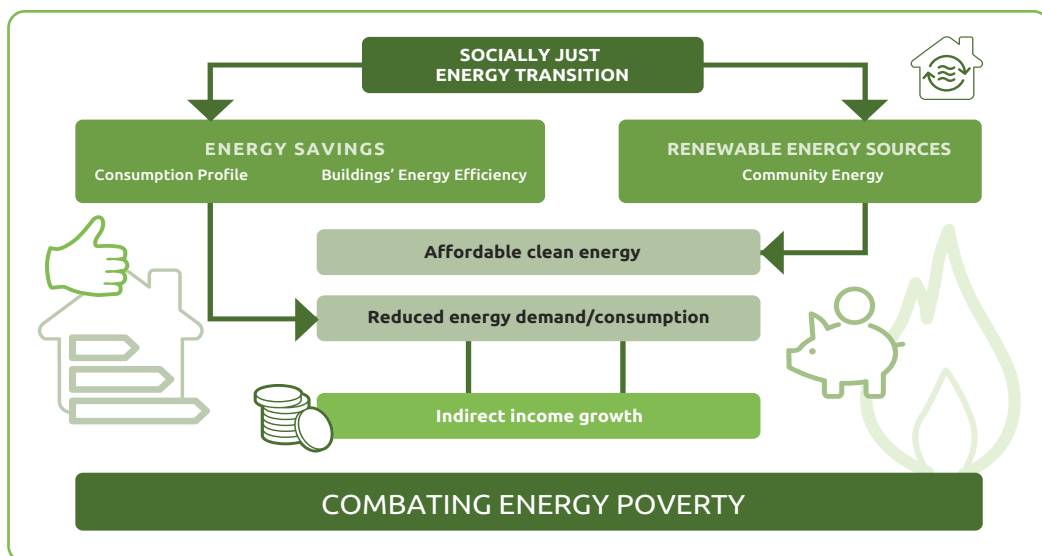
4. PROPOSALS FOR ADDRESSING ENERGY POVERTY

The following proposals on addressing energy poverty are instigated by the phenomenon's multifaceted nature which is intrinsically linked to the financial status of vulnerable population groups, to excess energy consumption attributed to residencies' poor energy performance and to high energy and fuel costs. This acknowledgement prompted the proposals described extensively in this section. It is of the essence that energy poverty causes are combated simultaneously through a "holistic approach" encompassing a blend of social, energy and environmental policies (Diagram 9). Admittedly, the transition from a centralized fossil fuel energy production to a decentralized low carbon emissions model that will cede priority to social and energy justice may constitute the medium to address energy poverty effectively (see section 1).

The proposed actions integrate sustainable solutions aligned with climate-change policy, which indirectly generate financial savings for households whose living conditions can be ameliorated by fully utilising synergies between bodies, businesses and citizens. The proposals in question have multiple effects; they place citizens at the centre of the procedures, they contribute towards achieving national targets related to environmental conservation and climate-change mitigation and they address challenges such as high rates of unemployment.

As regards the structure of this section, general policy proposals which constitute essential components in drawing up an integrated national strategy on addressing energy poverty are firstly outlined. Subsequent to this, specialised proposals and actions in three key-sectors are described: a) information dissemination and training b) increasing buildings' energy efficiency and c) utilisation of renewable energy sources. The noted proposals focus on relieving consumers who already suffer from or are threatened by energy poverty; however broad scale implementation of the above-mentioned proposals is likely to benefit a wider population group. Apart from resolving the issues connected to energy poverty, the outcomes of combined efforts to implement the proposed policies and actions could also constitute a valuable tool in restarting Greek economy on sectors related to construction and economy and what is more, lend young people new perspective on innovative enterprises.

DIAGRAM 9: Just Energy Transition Pillars



Just Energy Transition is based on two pillars: energy savings and the development of community energy from Renewable Energy Sources (RES). Combined efforts concentrated on inspiring sensible energy consumption, on ameliorating buildings' energy efficiency and on promoting collective energy initiatives indirectly boost citizens' income and address energy poverty effectively.

4.1 POLICY VARIATIONS – NEW POLICY LINES

TARGETS:

There is no integrated, coherent energy poverty policy in institutional terms to date in Greece. The drafting of an Energy Poverty Action Plan has been announced though. The Plan will contain specific actions on ameliorating energy poor households' efficiency, social policy measures and energy pricing. It will also regulate the National Energy Poverty Observatory's⁶⁵ operation.

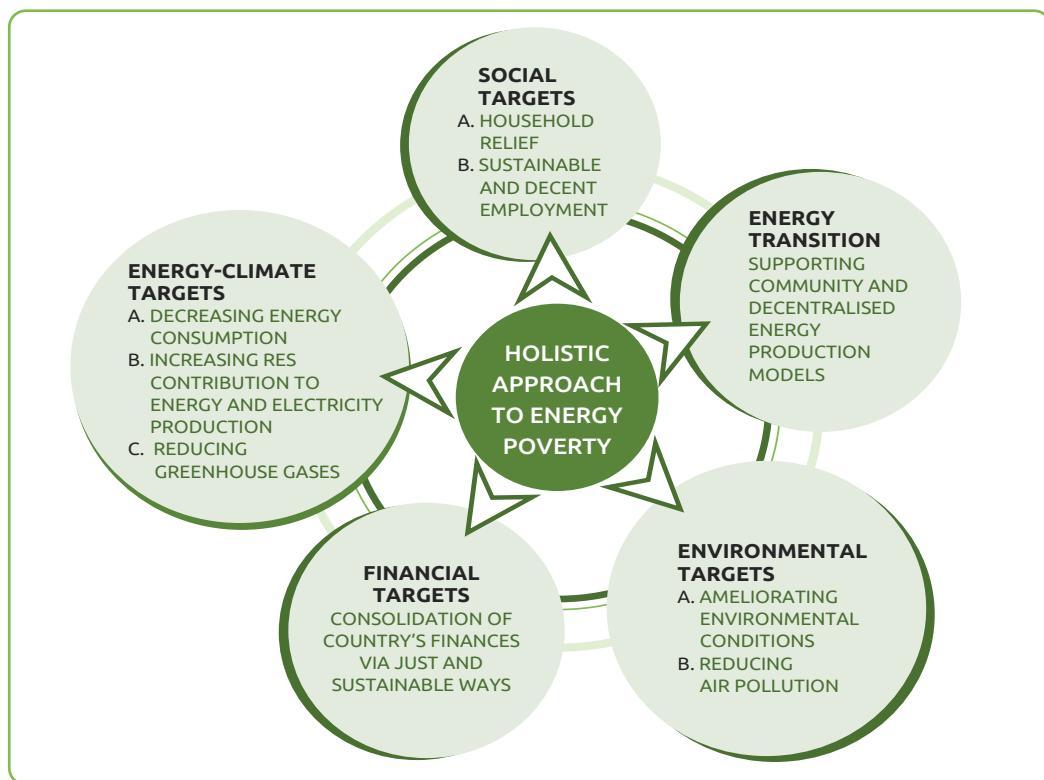
A national strategy that will address the phenomenon holistically should be aligned with European policies, should adjust accordingly to the particularities of each region and work towards achieving cross-sectoral targets set in environmental, social and energy policy plans (Picture 1). Some of these targets are:

- Social targets like alleviating households from energy poverty symptoms indefinitely, ameliorating living conditions inside the buildings to improve residents' wellbeing, creating sustainable and decent vacancies for the unemployed etc.
- Energy-climate targets like decreasing energy consumption, increasing RES contribution to energy and electricity production, reducing greenhouse gases and promoting decentralized

⁶⁵ Ministry of Environment and Energy (November 2018): National Energy and Climate Planning. Available on: <http://bit.ly/energy-poverty-65>

- community energy production models based on an upcoming economy and production model.
- Environmental targets such as environmental conservation, air pollution reduction etc.
- Financial targets such as consolidating the country's finances in a sustainable and fair manner and not via cutbacks.

PICTURE 1: The national strategic holistic approach may achieve cross-sectoral targets set in environmental, social and energy policy plans.



GOOD PRACTICES:

Several energy poverty strategies in conjunction with national policies on other sectors can be found implemented across Europe at national and local levels (environmental, societal etc.). Some of their common characteristics/orientations are summarized below:

- They extend across levels; starting from national level and reaching local municipal level where they assume the role of the facilitator
- They forecast specific quantitative targets
- They comprise measures on three key-sectors: dissemination of information, amelioration of buildings' energy efficiency and RES energy production
- They forecast methods and implementation monitoring tools.

A presentation containing the main points of each strategy follows in the table below (Table 3).

TABLE 3: Review of energy poverty strategies at European, national and local levels.

COUNTRY/ REGION	TARGETS	ACTIONS
England ⁶⁶	As many fuel poor homes as is practicable to achieve a minimum energy-efficiency rating of Band C, by 2030	Increasing energy-efficiency measures (mainly insulation and mechanics) by considering cost-effectiveness
Ireland ⁶⁷	Ensuring that as many vulnerable households as possible are included in the energy strategy programmes	<p>“Warmth and Well-being” (pilot scheme) programme involving wall and roof insulation to vulnerable households (the elderly, families with young children) and gradual expansion within the next 3 years</p> <p>Public consultation process on the establishment of minimum energy efficiency standards in the rented sector and widening the range of programmes so as to include owners whose tenants receive Housing Assistance Payment –HAP)</p> <p>Reviewing the “Better Energy Warmer Homes Scheme” eligibility criteria (to include more single-parent families) and empowering of the “Better Energy Communities Scheme” which funds local level pilot schemes (aid and consultation to consumers who wish to switch energy supplier and reduce cost)</p> <p>Vulnerable households’ income support via existing heating allowances, rent subsidies and the “Household Benefits Package”</p>
Scotland ⁶⁸ (Draft)	By 2013 an estimated 15% and by 2040 no more than 5% of households will experience energy poverty	<p>Establishing new legislation and statutory definition of energy poverty that will focus on low income households.</p> <p>Measuring energy poverty</p> <p>Publishing a long-term fuel poverty strategy, within a year of commencement of the fuel poverty Bill</p>

⁶⁶ UK Department of Energy and Climate Change (March 2015): Cutting the cost of keeping warm – A fuel poverty strategy for England. Available on: <http://bit.ly/energypoverty-66>

⁶⁷ Irish Ministry of Communications, Energy & Natural Resources (December 2015) A strategy to combat energy poverty. Available on: <http://bit.ly/energypoverty-67>

MONITORING	LEVEL	BODIES	COST	TIMESCALE - REVIEW
“Fuel Poverty Energy Efficiency Rating (FPEER). Based on “Standard Assessment Procedures” (SAP) and on basic energy poverty indicators	National	Department of Energy and Climate Change in collaboration with pilot scheme bodies	3 million GBP funded by the Department of Energy and Climate Change	SAP reviewed every 3 years
<p>“Warmth and Well-being” programme to be assessed by an independent research programme</p> <p>Quantifying the data of the “Warmth and Well-being” programme (pilot scheme) and contrast them to the measures cost</p> <p>Annual progress reports of the programmes by the Departments</p>	National	<p>Department of Communications, Climate Action and Environment (DCENR)</p> <p>On the second year the Department of Social Protection and the Department of Children and Youth Affairs are added to develop the piloting programme.</p> <p>The “Energy Poverty Advisory Group” is created to review the methodology and consultation to the DCENR</p> <p>THE Cabinet Committee on Social Policy and Public Service Reform is responsible for the coordination</p>	20 million euros government funds via DCENR and 20 million euros in 2016 for the Energy Communities Programme	Reviewed every 3 years. Annual reports and Stakeholders Forums to detect room for improvement
“Scottish Fuel Advisory Panel” to meet every 4 months and deliver progress reports to the Ministry	National	<p>“Scottish Fuel Advisory Panel</p> <p>“Scottish Fuel Poverty Partnership Forum”</p>	More than 1 billion GBP for the period 2009-2021 to tackle energy poverty and ameliorate energy efficiency	2031 is the review year for improvements on achieving the 2040 target

⁶⁸ Scottish Government (June 2018): Draft Fuel Poverty Strategy for Scotland 2018. Available on: <http://bit.ly/energypoverty-68>

COUNTRY/ REGION	TARGETS	ACTIONS
		<p>Implementing energy efficiency measures via “Energy Efficiency Scotland” and “Warmer Homes Scotland” programmes in an effort to review the eligibility criteria to include vulnerable households</p> <p>Advice on energy saving and supplier switching</p> <p>Establishing a public electricity supplier</p>
Stoke-on-Trent ⁶⁹	<p>As many households as possible to achieve an EPC rating of C in line with national policy by 2020</p> <p>Specifically: -Reduce energy consumption through behaviour change</p> <ul style="list-style-type: none"> • Improve building fabric and reduce cold related illness • Maximize household income and reduce household costs where possible • Increase RES generated energy for predictable pricing 	<p>Installing smart meters in all residencies by 2020</p> <p>Advice and information via the “Warm Homes Healthy People” programme for vulnerable households regarding the allowances they are eligible for, aid to citizens experiencing mental health problems, minor repairs, support with supplier switching, promoting RES installation</p> <p>Publishing advisory videos on energy efficiency practices</p> <p>Installation of 694 Solar Photovoltaic Systems onto Council housing under the RES promotional programmes “Feed in Tariff” (FIT) and “Renewable Heat Incentive” (RHI)</p> <p>Developing of District Heat Networks with A to be completed by 2019</p>
Kent ⁷⁰	<p>Information gathering and sharing</p> <p>Improving energy efficiency in line with national policy</p> <p>Reducing energy cost</p> <p>Increasing vulnerable households’ income</p>	<p>“Warm Homes” call centre to grow and become focal point of issues related to energy poverty</p> <p>Develop webpage with statistics on energy poverty</p> <p>Develop a database of local initiatives and services to support vulnerable citizens</p> <p>Inform owners that F and G rated properties in the private rented sector will become illegal to rent from 2018 unless upgraded</p>

⁶⁹ Stoke-on-Trent City: Fuel poverty strategy 2016-2020. Available on: <http://bit.ly/energypoverty-69>

MONITORING	LEVEL	BODIES	COST	TIMESCALE - REVIEW
<p>"Scottish Fuel Poverty Partnership Forum" to meet once (twice if needed) a year</p> <p>5-year span report to monitor strategy effectiveness</p>		"Home Energy Scotland" (HES)		
<p>Fuel Poverty Energy Group of stakeholders from commercial and public sector as well as other bodies that monitor progress by computing specific energy poverty indicators</p>	Municipal	<p>Independent information agencies</p> <p>Municipal "Hardship Commission"</p>	<p>Securing funding from central administration or from national programmes</p>	2016-2020
Municipal services	Municipal	<p>Municipal services</p> <p>"Kent and Medway Sustainable Energy Partnership" (KMSEP)</p> <p>"Kent Energy Efficiency Partnership" (KEEP)</p>	Not specified	Informative and promotional actions to be reviewed annually

⁷⁰ Kent Housing Group (March 2016): Delivering Affordable Warmth. A fuel poverty strategy for Kent. Available on: <http://bit.ly/energypoverty-70>

COUNTRY/ REGION	TARGETS	ACTIONS
Nottingham City Council ⁷¹	<p>To eliminate E, F and G EPC rated homes occupied by energy poor households by 2025</p> <p>To demonstrate the full benefits of energy efficiency measures to society, to the economy and to the environment</p> <p>To inform citizens about low-cost measures that enable energy bills saving and improve their wellbeing</p>	<p>Utilising existing funding via interaction with suppliers, technicians, bodies</p> <p>Securing funding from “Horizon 2020”, “Innovate U.K” and other such pilot schemes</p> <p>Upgrading 100 innovation-resistant residencies via “Energie Sprong” methodology</p> <p>Awareness campaigns and informative posters on behaviour measures and available funding</p>

PROPOSED ACTIONS

A. Drawing up a National Strategy – a Roadmap to Energy Poverty Eradication

The first proposal constitutes drawing up a National Strategy – a Roadmap to Energy Poverty Eradication. The Energy Poverty Action Plan that has already been announced may constitute sound foundation for this strategy but also for its investment incentive framework since it contains:

- Specific (quantified and ambitious) targets
- Specialized policy measures implemented locally and according to each region’s particularities rather than in the form of allowances (which alleviate but not eradicate the problem)
- Definitions of stakeholders and other interested parties [Energy Poverty Observatory, municipalities, ESCOs (Energy Service Companies) as well as their role in the Plan’s implementation process
- Potential funding sources and general orientation on partnerships and implementation timescale (a 10-year timescale with median progress targets to be monitored)
- Monitoring of implementation process and its outcomes

The *Roadmap to Energy Poverty Eradication* should describe the actions needed to tackle energy poverty at national, municipal and local levels and ought to be aligned with national energy policy strategies such as smart specialization sector for each periphery. It should mark gradual transition from social allowance-based policies towards innovative green policy driven by multiple investments. At the same time it ought to be consistent with the objectives and the commitments of Greece as Member State of the European Union on climate change and to advocate citizens’ active participation while considering vulnerable households’ particularities.

⁷¹ Nottingham City Council (August 2018): Fuel Poverty Strategy. Available on: <http://bit.ly/energypoverty71>

MONITORING	LEVEL	BODIES	COST	TIMESCALE - REVIEW
"Domestic Energy Efficiency Fuel Poverty Subgroup" (DEEFP) with action plans, bi-monthly meetings and yearly progress reports	Municipal	The "Domestic Energy Efficiency Fuel Poverty Subgroup" (DEEFP) consisting of municipal officials, independent corporations and academics	Not-specified	2018-2025

In order to prove the proposed actions successful, pilot schemes could be tried at designated regions where energy poverty is prevalent. In order for schemes to be successful at local level, certain issues need to be clarified; the exact steps to be taken towards utilising funding sources, the proposed measures adaptation to the particular needs of households in each region and perhaps certain targets need to be prioritized by local authorities before added to the regional strategy (smart specialisation sectors etc.).

B. Defining monitoring indicators/ statistical data collection

As stated in the "Clean energy package for all Europeans" it is obligatory for all Member States of the European Union to set quantifiable indicators-based targets on energy poverty mitigation at national level. The political commitment required is also highlighted. Defining specific monitoring indicators and data collection to support progress measuring will result in effective implementation of the measures as described in the National Energy Poverty Action Plan. Progress rates can be monitored by a specified body (for example the National Energy Poverty Observatory) modelled on the English energy poverty strategy⁷².

C. Empowering the National Energy Poverty Observatory's role and establishing collaboration with its European counterpart

The National Energy Poverty Observatory has the capacity to become medium of coordination, information dissemination and guidance on energy poverty related issues. An empowered Observatory could disperse more explicit information and guidance to local bodies, authorities and partnerships that have assumed the task of drafting local action plans (always in accordance with general guidelines outlined in the National Energy Poverty Action Plan). Conse-

⁷² UK Department of Energy and Climate Change (March 2015): Cutting the cost of keeping warm – A fuel poverty strategy for England. Available on: <http://bit.ly/energypoverty-72>

quently that would lead to more effective management and utilisation of available Community funds on the sectors of energy, climate-change and social inequity that take the lion's share in European funding. By capitalising on the close collaboration between the National Energy Poverty Observatory and its European counterpart, valuable expertise and successful practices can revolutionise the implementation of measures addressing energy poverty in Greece.

CONDITIONS

Resolving the energy poverty definition issue and computing its indicators are prerequisites to successful implementation of the aforementioned actions. The phenomenon's multifaceted nature should be deeply comprehended and the difference between income poverty and energy poverty clarified (through awareness campaigns, articles and studies). This is the only viable way to locate households that suffer from or are threatened by energy poverty and assess their status accordingly so that decision-makers may draw up an effective policy which will be inclusive of not only "income poor or vulnerable households" but also "energy poor households". The creation of a database storing studies, articles, effective practices etc. on energy poverty in Greece and the country's building stock will also be of aid. The database might be integrated in the National Energy Poverty Observatory's webpage, as in the case of the EU Energy Poverty Observatory's digital "library".

It is recommended that the national energy poverty strategy – i.e. the National Energy Poverty Action Plan, is planned under the supervision and consultation of multiple stakeholders (citizens, social and solidarity-based economy bodies, local authorities, traditional market operators, universities, public health bodies, property owners, public welfare etc.) since the majority of previously applied measures and indirect relief policies were in essence fragmented, inefficient and non-targeted. Starting from regional level and progressively expanding, the public consultation process will assist in underlining particularities and detecting possible barriers first locally and then nationwide by means of instructive meetings organised by the Ministry, by forums, and via the electronic consultation platform (www.opengov.gr). Emphasis should also be laid on the integration of energy poverty into the "Combating Poverty and Social Inclusion" constituent of regional planning programmes and in particular, into the upcoming Regional Operational Programmes and the reviewed Smart Specialisation Strategy.

Finally, reducing the investment risk on projects related to energy poverty tackling mobilises funding tools or conditional low-interest loans for vulnerable households something that can be rendered as success evaluation criterion for the aforementioned actions. Establishing an appropriate legal framework – obligatory or not – such as legally binding targets for energy Certificates, provisions for tax-reliefs for energy efficient households, conditions for admission to the programme etc. may also constitute a complementary evaluation criterion.

4.2 PUBLIC AWARENESS AND TRAINING

TARGETS

Interventions on the buildings' envelope, systems and equipment as well as changes in consumers' behaviour are key-steps in saving energy. Consumers' behaviour may affect a building's total energy consumption up to 25% - 30%⁷³, ⁷⁴ either in a positive way following the application of suitable techniques that reduce energy consumption, or negatively by excess energy demand in cases when residents lack adequate practical knowledge or training. Deeply comprehending the concept of *energy poverty* (see section 1) is the keystone of enhancing public awareness of the phenomenon. Information on how this predicament came about, what and whom it concerns, how consumers are immediately affected and which actions can aid in tackling it, should become public knowledge. Enhancing public awareness is also fundamental in ameliorating citizens' living conditions (reduction in energy bills, generating financial saving) and in achieving long-term objectives set by the European Union (Diagram 10). It could be argued though that its most essential outcome is the empowerment of the energy consumers' role resulting from their transition from mere consumers to *prosumers*. By reversing previous trends, the now actively engaged in energy production prosumer may reap the benefits of the current energy production system's and energy distribution network's transformation.

Awareness campaigns of integrated, instructive content appeal to all household members. Adults should be informed about the part they are called to play and adolescents may constitute the target group of such campaigns. Appropriate instruction from an early age will render informed citizens – prosumers⁷⁵ who will possess adequate knowledge in order to avoid excess energy consumption and energy waste at home, at communal areas and at public spaces. Targeted campaigns are inclusive of student homes and residencies where energy saving techniques can by all means be applied.

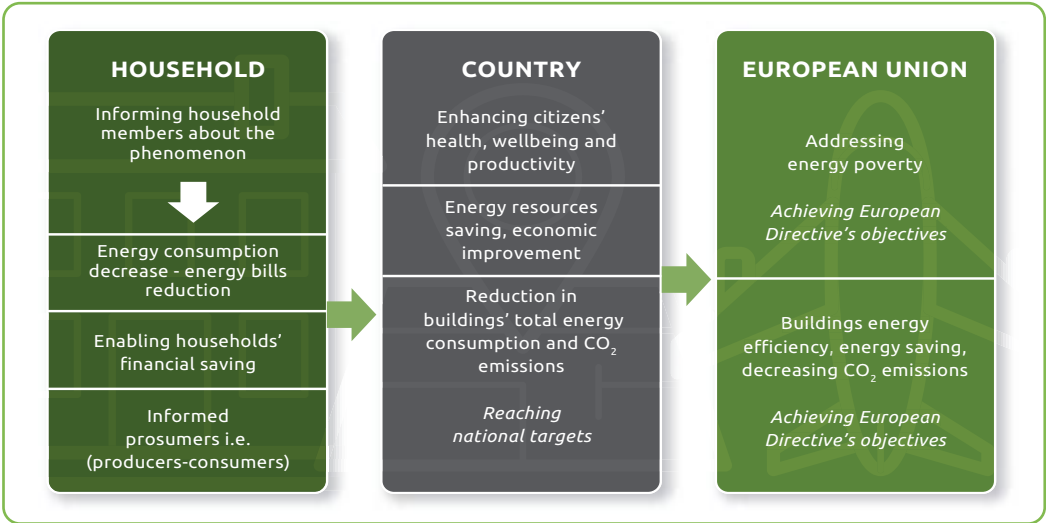
The awareness campaigns and training in question should constitute horizontal interventions. Starting first locally, targeted dissemination of information and prioritising can play a vital role in ameliorating vulnerable households' living conditions. More specifically, the contribution of local bodies such as municipalities, clubs and associations is vital in locating vulnerable population groups due to proximity. Simple energy saving and bill reduction tips along with adopted practices applied in daily routine can also be an essential constituent of the awareness campaigns for all target-groups (Picture 2).

⁷³ Science Direct (December 2017): The impact of occupants' behaviours on building energy analysis: A research review. Available on: <http://bit.ly/energypoverty-73>

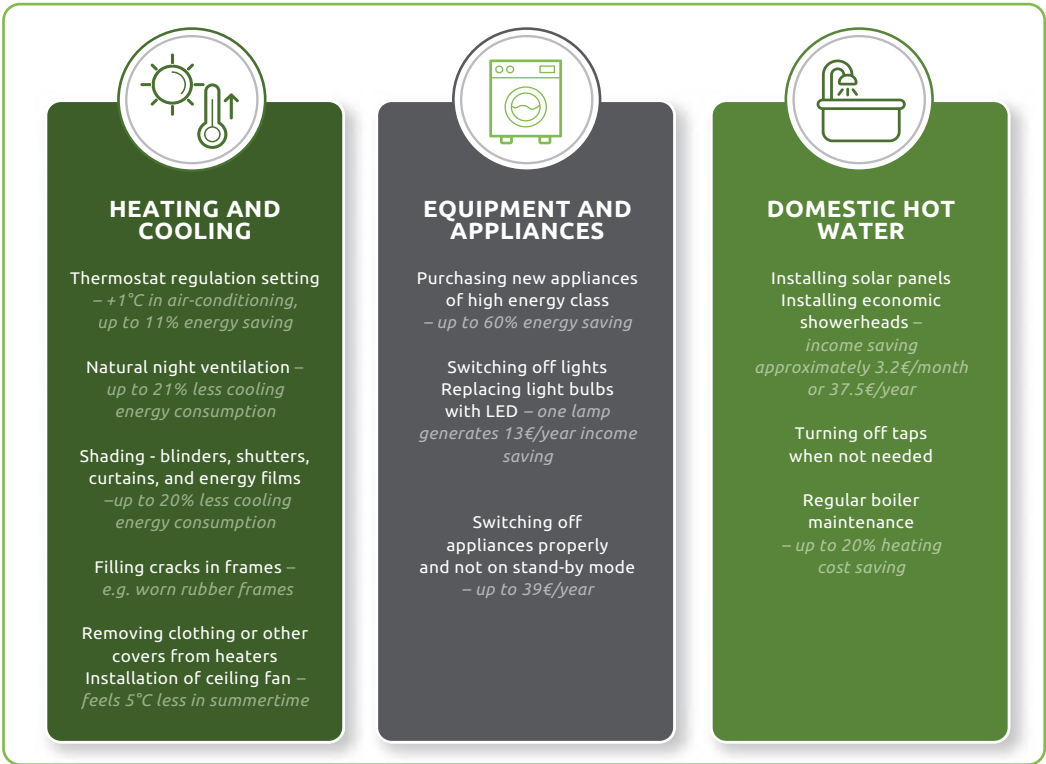
⁷⁴ MDPI (April 2018). The Impact of Building Occupant Behavior on Energy Efficiency and Methods to Influence It: A Review of the State of the Art. Available on: <http://bit.ly/energypoverty74>

⁷⁵ *Prosumer*: (producer + consumer). The term *prosumer* is used to describe citizens who with the aid of the rising New Technologies actively participate in the energy system by producing and consuming energy. Available on: <http://bit.ly/energypoverty75>

DIAGRAM 10: Citizens' awareness and training targets



PICTURE 2: Simple useful tips on energy saving – awareness and training contributing to reduced consumption



Source: <https://www.energysavingsteam.eu/easy-energy-savings>

GOOD PRACTICES

With millions of households across Europe affected by energy poverty, exemplary awareness-raising initiatives and actions have already been implemented to tackle the effects of the phenomenon. Many research programmes have been conducted at European level with the aim of saving energy, reducing energy bills, changing consumers' habits as well as transmitting and exchanging efficient practices. Many of these programmes apply the methodology of home visits by specially trained energy advisors who conduct energy evaluations in order to depict the residencies' status and suggest energy saving solutions and relief practices for households. In a combined effort, smart meters are utilised to assist citizens in monitoring their energy consumption profile and in adopting habits oriented towards energy and income saving. This shift in consumers' behaviour aids the efforts of Member States of the European Union that are set on achieving broader energy saving and energy efficiency objectives. The exemplary projects mentioned below have set a precedent for such actions:

- Project **ACHIEVE**⁷⁶ (Intelligent Energy Europe) aimed to reduce energy consumption and energy bills through practical tips and interventions in residencies. To accomplish this, involvement of multiple bodies such as municipalities, energy producers and energy agents, social welfare organisations, social housing providers, schools and communities was required. During the three years of its operation, approximately 2,000 households participated in its 50-hour training which on average generated 150euros/household income saving from energy and water bills and reduction by 320kg in CO₂ emissions. At the same time, vulnerable population groups such as long-term unemployed citizens, students and volunteers had opportunity to receive relevant professional training and be integrated – or re-integrated – into the job market.
- By adding value to the success and effective implementation of the ACHIEVE project, the initiative was continued through the project **COMPOSE** (European Territorial Cooperation, Interrreg MED)⁷⁷. Apart from conducting scheduled energy evaluations, this project offers insights into sustainable development and utilisation of RES systems for the benefit of low-income households and seeks to integrate RES into residencies. Involvement of local consulting companies, stakeholders and citizens is integral to “participative approach” which aspires to disseminate information and promote installation of RES systems (especially photovoltaics) in order to increase residencies' energy saving and energy efficiency.
- The above-mentioned awareness-raising home visits methodology was applied by 5 partners of the **EC-LINC**⁷⁸ project (Intelligent Energy Europe programme) who provided tailored information and consultation on energy and water saving to low-income households in Serbia, Croatia and Turkey. Additionally, development of training tools assisted in sharing effective practices on energy and water saving and energy saving appliances, with more than 35,000 households.
- Likewise, the **ELIH-MED**^{79, 80} project concentrating on Mediterranean countries, (European Territorial Cooperation, Interreg MED) focuses on improving low-income households' energy

⁷⁶ Intelligent Energy Europe (2011-2014): Actions in low income Households to Improve Energy efficiency through Visits and Energy diagnosis (ACHIEVE): Available on: <http://bit.ly/energypoverty-76>

⁷⁷ Project Compose: From energy savings to RES investments – France. Available on: <http://bit.ly/energypoverty-77>

⁷⁸ EC-LINC Project (2011-2014): Energy Check For Low Income Households. Available on: <http://bit.ly/energypoverty-78>

⁷⁹ ELIHMED Webpage: Available on: <http://bit.ly/energypoverty-79>

⁸⁰ Build Up (October 2014): ELIH MED Valencia Energy Efficiency Pilot project. Available on: <http://bit.ly/energypoverty-80>

efficiency through a series of interventions on the buildings' thermal envelope. Its pilot action was tried on two blocks of flats in Valencia. The residents were informed about the option to self-monitor the consumption of their household and adjust their appliance handling habits accordingly in order to save energy. Apart from the energy savings generated from the building's envelope upgrade, the residents realized via the installed smart meters that even small changes like replacing light bulbs can make a great difference to energy consumption, increase thermal comfort levels and therefore improve quality of life⁸¹.

- Young students' households constitute a respectable percentage of city residents and of the private-rented sector while on-campus residencies contribute significantly to total energy consumption. Based on this framework the European initiative **SAVES 2 – Students Achieving Valuable Energy Savings 2**⁸² (**HORIZON 2020**) aims to alert students across Europe on energy saving matters through attractive and inspiring initiatives and actions held by students themselves such as photography contests, online information activities, quizzes and awareness-raising campaigns. Academics and researchers from 8 European countries (Belgium, Bulgaria, Cyprus, Greece, Ireland, Lithuania, Rumania and the United Kingdom) participate in the project and they are committed to informing more than 220,000 students about energy saving practices and ways to reach the saving target of 30GWh which is equivalent to 3,300 households' yearly consumption in Europe^{83, 84}.
- The **ASSIST – Support Network for Household Energy Saving** project aims to raise awareness, alter citizens' behaviour and tackle energy poverty by actively engaging citizens in the energy market and energy production process. Involvement of local and regional authorities is needed to address the challenges faced by financially vulnerable consumers and low-income households. 48,000 consumers belonging to vulnerable population groups across 6 countries – Italy, Spain, the United Kingdom, Poland, Belgium and Finland, have benefited from the ASSIST initiative. Specially trained "Home Energy Advisors" developed targeted interventions to better accommodate each household's needs and provided consumers with target-oriented advice. Pinpointing the energy poverty problem and raising stakeholders' awareness about it are listed among the objectives of the project which aims to trigger more efficient energy poverty tackling measures⁸⁵.
- The **EMPOWERING** initiative was implemented across 6 European countries – Italy, Spain, Rumania, Croatia, Hungary and Greece. It mobilised more than 50 municipalities in a concerted effort to shift towards a low-carbon, low-energy consumption community by carrying out transnational exchange programmes and educational activities (seminars, educational visits, tailored skills development programmes). Committed in the effort to address energy poverty and save energy, local municipal and regional authorities organised these activities to assist local governments in developing integrated multi-fund energy poverty and energy saving strategies plus innovative financing mechanisms⁸⁶.

⁸¹ ELIH MED (April 2015): Valencia Energy Efficiency Pilot project. Available on: <http://bit.ly/energypoverty-81>

⁸² SAVES2 Project (May 2017): Article by Joanna Romanowicz, SAVES2 Project Manager. Available on: <http://bit.ly/energypoverty-82>

⁸³ SAVES2 Project (May 2017): Aims and general description. Available on: <http://bit.ly/energypoverty-83>

⁸⁴ European Commission (June 2018): European energy saving project wins international award for student leadership. Available on: <http://bit.ly/energypoverty-84>

⁸⁵ ASSIST Project. Available on: <http://bit.ly/energypoverty-85>

⁸⁶ EMPOWERING Project. Available on: <http://bit.ly/energypoverty-86>

- The **EU Energy Poverty Observatory**, an initiative by the European Commission has initiated in collaboration with local authorities awareness campaigns in Greece, Czech Republic, Rumania and Portugal where the highest rates of energy poverty are encountered. The campaigns are held online but also through informative events so that citizens can have access to practical advice on energy and water saving as well as tips on reducing energy bills⁸⁷.
- Efforts have also been made at municipal level to support energy poverty policy implementation and secure funding. The **Municipalities of Arnhem and Rotterdam** in Holland worked together with local Non-Governmental Organisations (NGOS) and local energy suppliers to set up energy audit programmes to combat energy poverty locally. Accordingly, the **Municipality of Gent** (Belgium) worked together with local social services and the **Municipality of Les Mureaux** worked together with a local NGO and the national energy agency to set up and develop energy audit programmes and Information desk programmes by utilising national funds⁸⁸.

PROPOSED ACTIONS

A. Awareness – raising campaigns addressed to schools

It is essential that efforts to shape energy behaviour start from a young age. Implementation of an adequately structured and age-fitting informative and educational programme in primary and secondary education will be instrumental in acquainting students with the concept of energy poverty along with the ways in which the phenomenon affects their homes, their city, their country and in promoting habits they may adopt in order to contribute to energy saving and energy bills reduction at home and at school. Collaboration among all stakeholders such as educators, researchers and environmental associations is prerequisite to developing an integrated educational programme. By utilising and enriching existing educational material, concerted actions from the stakeholders' part will be successful in enhancing awareness⁸⁹. Following approval by the Ministry of Education and Religious Affairs and the Institute of Educational Policy, the programme should be addressed directly to students and members of the entire school community. For successful promotion and the schools' admission to the programme, it is essential to secure support of local bodies like the local Directorate of Primary Education and the local Directorate of Secondary Education. This outcome-oriented programme presupposes adjustment to the various age-groups in the school community which will generate development of tailored projects for primary education students and secondary education students (Table 4).

⁸⁷ EU Energy Poverty Observatory webpage: Available on: <http://bit.ly/energypoverty-87>

⁸⁸ EU Energy Poverty Observatory Guidance. Designing effective energy poverty policies in municipalities. Available on: <http://bit.ly/energypoverty-88-1> and <http://bit.ly/energypoverty-88-2>

⁸⁹ European Commission. Educational material. Available on: <http://bit.ly/energypoverty-89>

B. Energy Consultants' Team and smart meters installation

Adequate training and effective coordination of the “Energy Consultants Team” is a proposal that can benefit population groups already struggling with energy poverty but can also integrate – or re-integrate – the unemployed into the job market. This proposal puts forward the development of an academic and vocational education training programme that will appeal to unemployed university graduates and scientists of multiple disciplines: engineers, economists, energy specialists (energy researchers, RES technology researchers, automation technology experts, energy saving and building applications technicians etc.).

Through adequate training the prospective energy consultants will obtain the necessary background knowledge and expertise to provide assistance – mainly but not solely – to vulnerable population groups. Applying the methodology of home visits will enable them to inform and advise members of each household on ways to save energy and reduce energy bills, to conduct energy evaluation of the residencies' status and to suggest simple low-cost energy saving interventions like replacing light bulbs with LED, covering cracks in frames or doors, reducing heat loss, installing shading systems etc. More profound and efficient interventions could also be implied however costly these may be. In those cases energy consultants trained on energy investments could assess the potential of an integrated proposal for each household by demonstrating comparative data for the proposed interventions and the results of their assessment via market research. Another important aspect of the project will be simultaneous appraisal of each household's financial capacity in order to secure financial sustainability for the “energy interventions scheme”. This way, it is ensured that property owners will have the means to fund the project and accommodate their energy needs. In a nutshell, financial sustainability of the “energy interventions scheme” relies heavily on informing citizens about the perks of being a *prosumer*.

Following consultation, smart meters should be installed in the residencies. This way, residents will become aware of their energy consumption and the impact these small changes can have on their energy consumption levels (e.g. setting the thermostat 1°C lower, switching off the lights, etc.) After the smart meters are installed, the residencies will be visited by an energy consultant who will monitor and collect the outcomes and will further consult the residents on practical matters regarding energy saving.

A visit by the entire energy team will undertake a full presentation of the financial and energy benefits, will propose further actions, assess the household's financial status and via market research present also a financial assessment of the energy saving proposals (Table 4). By considering each household's needs and the accomplishments of the energy consultants, a common “energy interventions plan” can be drawn up that will be enriched by proposed interventions on the building's envelope and equipment, by recommendations suggesting a shift in habits, by illustrating the perks of being producer-consumer thus assisting financially the households.

C. Energy Poverty Information Desk

An Energy Poverty Information Desk operating at municipal or regional level and coordinated by local governments is proposed. Organisation and coordination of the project can materialise in liaison with local/regional bodies, associations and non-governmental organisations, social enterprises and/or local Energy Communities. Information and advice on techniques that save

energy and reduce energy bills will be provided directly to citizens, especially to those who find accessing the Internet or handling smart technology challenging. At the same time, the Information Desk will respond to young people's and students' needs via its informative, continuously updated webpage and via telephone support for instant response to their queries. Finally, the Information Desk could also hold information events independently or in liaison with other bodies as well as welcome similar initiatives by other stakeholders (see proposal D).

D. Awareness initiatives/events addressed to citizens

Energy poverty awareness-raising events and actions should be addressed to all citizens: young people, students, parents, entrepreneurs, the elderly etc. Those initiatives can be organized either by the Energy Poverty Information Desk (see proposal C) in liaison with various bodies, or independently for dissemination of targeted information. Municipal authorities in collaboration with local entrepreneurs, associations and organisations will be able to provide information on current energy prices and available new technologies and also demonstrate the current conditions in the energy sector. This way, citizens will be enabled to examine available options and compare alternative solutions. In addition they will be informed about the potential to generate energy at home or in their district/community etc. The aforementioned collaboration could be based on a quid pro quo relation. Local governments can assume the development of the projects and campaigns by adopting techniques applied previously in successful practices, by securing the Energy Poverty Observatory's technical assistance, by capitalizing on their collaboration with local bodies and finally by integrating their targets into the Action Plan of the Covenant of Mayors for Climate and Energy.

Universities may also prove invaluable in organising and conducting promotional, awareness campaigns and actions nationwide. Informing and integrating the entire academic community (students, professors, and personnel) in the project and holding public events jointly with municipal authorities in the presence of stakeholders, is deemed vital. Concurrently, interdisciplinary and inter-scientific collaboration between university departments would attribute value to an existing and successful project and run it at national scale.

PREREQUISITES TO SUCCESSFUL ACTIONS

Collaboration among multiple stakeholders is prerequisite to successful project implementation and goal attainment. Among these stakeholders we find:

- **Ministry of Environment and Energy, Ministry of Labour and Social Affairs, Ministry of Education and Religious Affairs, Ministry of Health**

Collaboration between the designated Ministries and stakeholders is crucial for successful horizontal implementation of each proposal and recommended action.

- **Municipalities and Regions**

Project success is contingent upon the involvement of local and regional authorities because due to proximity vulnerable population groups can more easily be located and public awareness campaigns more effectively organized and/or promoted in every city.

- **Higher Education and Research Institutes, Institute of Educational Policy**

In a joint effort, members of the scientific community and the designated Ministries may develop reliable informative and instructional material. Input from social stakeholders such as

associations or consumers' institutes is crucial. Parallel to this, targeted research for data collection from the entire school community can be conducted.

• **Directorates of Primary and Secondary Education, parent/guardian-teacher associations, teachers associations**

The particular stakeholders' parties can play a decisive role in collating, publishing and sharing the educational project with school units so as to secure their participation and support. Involving parent/guardian-teacher associations is essential for addressing the energy poverty awareness campaigns to all family members.

• **Energy market operators in Greece**

The energy market operations' contribution focuses on generating employment and internships for energy consultants while their involvement in energy poverty tackling actions may work towards achieving saving targets set in the Obligatory Energy Efficiency Scheme.

TABLE 4: Proposed informative, instructive actions and their benefits

TARGET GROUPS	MONITORING (IMPLEMENTATION: ORGANIZATION /MEDIUMS)
Primary and Secondary Education School communities	<p>A. Awareness-raising campaigns at schools</p> <p>Creating and developing awareness projects for students of all levels</p> <p>Implementation of approved campaigns at school units nationwide</p> <p>Combined efforts of stakeholders to compose informative instructive material. Utilise and enrich existing such material</p> <p>Submit complete integrated programme (objectives, stakeholders, material) to Ministry of Education and Religious Affairs and to Institute of Educational Policy for approval</p>
Citizens – Consumers-households	<p>B. Energy Consultants Team and Installation of Smart Meters</p> <p>Professional training for the young unemployed, graduates, scientists to form a team of professionally trained certified consultants.</p> <p>Home visits by Energy Consultants to provide support as well as financial and technical advice to households on saving energy and reducing energy bills</p> <p>Installing smart meters and consulting citizens on their function</p>

- **Social enterprises and Energy Communities**

Social enterprises and prospective local Energy Communities may evolve into medium for public awareness-raising of energy poverty issues and may encourage citizens to assume active role in the energy market.

- **Associations and consumers' associations – NGOs, environmental organisations, welfare associations**

Local associations, organisations, NGOs and associated parties will be able to organise, promote and hold informative events since they have the means to approach citizens in need.

IMPLEMENTATION AGENTS STAKEHOLDERS	DURATION, OUTCOMES - IMPACT	PERKS FOR CITIZENS AND STAKEHOLDERS
<ul style="list-style-type: none"> • Ministry of Education and Religious Affairs, Ministry of Environment and Energy • Institute of Educational Policy • Directorates of Primary and Secondary Education • Local agents (NGOs, environmental education associations, social enterprises, Energy Communities) • Educational and Research Institutes • Parent/guardian-teacher associations, teachers' associations 	<p>During primary and secondary education levels (from 1st grade of primary school till final grade of high-school)</p> <p>Shape behaviour from an early age</p>	<p>Approved long-term project to run repeatedly to raise students' awareness and develop their instruction</p> <p>Shape behaviour from a young age</p>
<ul style="list-style-type: none"> • Ministry of Education and Religious Affairs, Ministry of Labour and Social Affairs • Research Institutes, Universities • Consumers' Unions and environmental organisations • Market and energy management operators • Municipal authorities to detect vulnerable households 	<p>Long-term campaign</p> <p>Locating vulnerable population groups, raising public awareness of energy poverty and tackling measures, assisting in ameliorating quality of life</p>	<p>Raising public awareness, relieving households, encouraging consumers' active role</p> <p>Integration –or re-integration– of unemployed scientists into the job market by certifying new skills to be applied in the future</p>

ΟΜΑΔΑ ΣΤΟΧΟΣ	ΠΑΡΑΚΟΛΟΥΘΗΣΗ (ΠΩΣ ΘΑ ΕΝΤΑΧΘΕΙ: ΠΡΟΤΑΣΕΙΣ ΟΡΓΑΝΩΣΗΣ/ ΜΕΣΑ ΥΛΟΠΟΙΗΣΗΣ)
Consumers-households	C. Energy Poverty Information Desk Establishing Information Desk (in-person consultation, informative webpage, phone support, informative events)
Residents – Consumers-households	D. Informative initiatives/events addressed to citizens Liaising with stakeholders to hold informative events addressed to all citizens regarding assessed energy supply alternatives, information dissemination and consultation on potential energy production at household and/or district level

4.3 INCREASING BUILDINGS' ENERGY EFFICIENCY

TARGETS

Based on the realisation that reducing energy waste lists energy cost-efficiency among its many benefits, it becomes clear that increasing buildings poor energy efficiency is a matter of extreme strategic importance in energy poverty tackling efforts. According to the 2011 census (Hellenic Statistical Authority), 55% of residencies in Greece had been built prior to 1980 the year of the Thermal Insulation Regulation's enactment. With the majority of buildings prone to thermal loss, it is evident that extended energy-efficient renovation practices on the buildings' envelope and fabric should be applied⁹⁰. Increasing energy performance of the existing building stock is crucial for meeting energy and climate objectives, for decreasing dependence on fuel and electricity imports, for generating employment and ameliorating quality of life. Admittedly, it plays a pivotal role in re-directing the country's economy towards a more sustainable future⁹¹.

Several studies have confirmed that energy renovations in vulnerable households' residencies when compared to allowance-based relief measures are proven a most effective energy

⁹⁰ Ministry of Environment and Energy (December 2014): Long term strategy to drive investments on the building stock - residencies and commercial buildings both public and private (Directive 27/2012/EU, Art.4). Available on: <http://bit.ly/energypoverty-90>

⁹¹ Renovate Europe Campaign webpage. Available on: <http://bit.ly/energypoverty-91>

ΦΟΡΕΑΣ ΥΛΟΠΟΙΗΣΗΣ ΕΜΠΛΕΚΟΜΕΝΟΙ ΦΟΡΕΙΣ	ΔΙΑΡΚΕΙΑ, ΑΠΟΤΕΛΕΣΜΑΤΑ – ΕΠΙΔΡΑΣΗ	ΟΦΕΛΗ ΣΕ ΠΟΛΙΤΕΣ ΚΑΙ ΕΜΠΛΕΚΟΜΕΝΑ ΜΕΡΗ
<ul style="list-style-type: none"> Local authorities (municipality, region) Local bodies, associations, NGOs Social agents (e.g. social workers, environmental consultants) Social enterprises, Energy Communities 	<p>Long-term campaign</p> <p>Raising public awareness</p>	<p>Constant information dissemination and direct contact with citizens</p> <p>Empowering citizens and encouraging their active role</p>
<ul style="list-style-type: none"> Municipalities: relevant Department Local entrepreneurs, consultants, social enterprises, Energy Communities Local universities/educational institutes Local –or no – NGOs, associations, etc. 	<p>Municipal Department's piloting action and implementation of informative actions under financing plan in a specific time span</p> <p>Permanent establishment for implementation, working group made up of professional delegates and social groups' members. Development of long-term strategic plan on information dissemination</p>	<p>Raising public awareness at municipal level</p> <p>Empowering citizens and encouraging their active role</p>

poverty tackling medium. At the same time residencies' inner thermal comfort improves on short amortization period – especially in cold-climate zones – and major wider benefits are generated for people's safety, for sound insulation and aesthetics, for health and productivity etc. Finally, sectors pertaining to construction which have been experiencing the effects of the latest recession could boost productivity through energy-saving renovations performed on residencies. According to a study conducted by Greenpeace, targeted promotion of energy-saving practices to 700,000 residencies would generate savings of approximately 1,000 euros yearly per household. On a 10-year scale, the total amount saved is computed to approximately 5.7-6 billion euros while it would also generate 30,000 – 35,000 new vacancies⁹².

Apart from promoting our vision for a highly energy-efficient and decarbonized European building stock by 2050, the Renovate Europe Campaign lists energy poverty eradication in the benefits generating from buildings' energy renovation. An integrated and holistic approach to energy efficient renovations is the only sustainable solution to this predicament that the European Union is called to address.

Adrian M. Joyce, *EuroACE, Renovate Campaign Director*

⁹² Greenpeace Greece (November 2015): Transforming the Greek building sector with the help of the sun! Available on: <http://bit.ly/energypoverty-92>

GOOD PRACTICES

The practices that follow are regarded as inspiring examples to be adjusted to the climate particularities and legislative framework of Greece. They showcase that investment in the energy efficiency sector is indeed feasible even for vulnerable households as long as the challenge of securing initial capital is effectively tackled through adequate funding and financing tools applied by schemes.

- The **Nottingham City Council**⁹³ managed to reduce its energy poverty levels drastically through synergies and utilisation of available financing tools. Establishing an energy non-profitable Organisation managed to secure affordable energy supply for vulnerable households. Also, in tandem with public organizations, energy providers, etc. the “City Council’s Housing Strategy Team” coordinated and monitored all energy renovations in privately and publicly owned residencies.
- The **Bristol Energy Efficiency Scheme**⁹⁴ managed to insulate 10,000 residencies in the city – priority given to vulnerable population groups like the elderly, low-income families etc. Property owners and leaseholders had the opportunity to participate in the free cavity wall and loft insulation project. The project was funded by Bristol City Council and a partner fuel provider.
- The **Picardie Renovation Pass**⁹⁵ is a project in progress in Picardie, France. In collaboration with the Public Service Energy Efficiency, the region of Picardie utilises investment loans to support thermal renovation of residential buildings via Energy Performance Contracting. The project is supported by the European Fund for Strategic Investment through “ELENA” financing. Its contracting began in December 2015 and the estimated amount of energy saved is computed approximately to 75%. The total investment is expected to amount to 58 million euros.
- The **AgEOS**⁹⁶ is an innovative initiative in the form of contract named “Profit Guarantee” and appeals to residents of Ostend, Belgium. The project aims for energy consumption reduction and consequently buildings’ energy efficiency amelioration via a contract/scheme according to which households may initiate loan repayments the moment the energy target is met.
- The **Latvian Baltic Energy Efficiency Facility (LABEEF)**⁹⁷ is a company based in Latvia that facilitates Energy Performance Contracting between ESCOs and private entrepreneurs. Efforts based on European funds are made to reduce investment risk.
- The **Better Home**⁹⁸ project in Denmark is the brainchild of four distinct companies which provides renovation packages of certified specifications and loan repayments from revenue generated by energy saving.

⁹³ Nottingham City Council (July 2019): Council plan puts citizens at the heart. Available on: <http://bit.ly/energypoverty-93>

⁹⁴ Centre for sustainable energy (2008-2012): Bristol Energy Efficiency Scheme (BEES). Available on: <http://bit.ly/energypoverty-94>

⁹⁵ CEE Bankwatch Network (June 2016): Energy efficiency in residential buildings in France: Energy Performance Contracting to boost investments. Available on: <http://bit.ly/energypoverty-95>

⁹⁶ EOS project webpage. Available on: <http://bit.ly/energypoverty-96>

⁹⁷ European Climate Initiative – EUKI (December 2018): Factsheet: Latvian Energy Efficiency Facility LABEEF. Available on: <http://bit.ly/energypoverty-97>

⁹⁸ Better Home project webpage(July 2019).Available on: <http://bit.ly/energypoverty-98>

- The **Energy Efficient Mortgages Action Plan**⁹⁹ is an initiative of the European Mortgage Federation. Following consultation with various agents the target is set to promote energy efficient mortgages. The success of the initiative is assured because of the low-risk entailed in energy efficiency loans due to the renovated buildings' increased re-sale and rental value. Therefore energy renovated buildings constitute guaranteed high value for the credit institutions and loan-borrowers have a sound credit rating due to reduced energy bills which are conducive to improved disposable income rates.
- The **Energie Solidaire**¹⁰⁰ project was introduced in 2014 by *Les Amis d' Enercoop*. It is an innovative financing system applied by local energy poverty initiatives. The project accepts donations via energy bills in order to support local energy poverty initiatives. 30,000 customers of the Enercoop energy cooperative support the project to date but there are plans to widen the range so as to include more energy providers. This will spur donations and drive financing. Its long-term target is to develop a cooperative platform where all project beneficiaries will donate part of the revenue generated by energy saving. This common fund will be used to finance new projects addressed mainly to vulnerable households.
- The **iBRoad**¹⁰¹ project, funded under the European Union's HORIZON 2020 research and innovation programme, assists building owners during a renovation's designing process in removing barriers arising from lack of practical knowledge on energy efficient or renovation measures' implementation. It introduces the term *renovation roadmap* that demonstrates the renovation process of a particular building on a timescale of 10-15 years step-by-step. It also contains evaluation of the building as a whole and provides a customised plan by taking into account residents' needs and particular characteristics (age, financial status, households' current and future composition and status). A repository of information is annexed to the Roadmap (iBRoad Log) which compiles permits, materials, elements, notifications for maintenance and refurbishment etc.
- The **Carbon Co-op**¹⁰² is a non-profitable cooperative based in Manchester. Its aim is to provide tools, knowledge and expertise to residents and communities so that they may radically reduce their households' energy consumption and therefore carbon emissions. Synergies with companies and agents equip the cooperative with the means to facilitate networking, offer information services, training opportunities as well as consultation by experts and possibly carry out small-scale renovation work.

PROPOSED ACTIONS

A. Consultation and guidance through an integrated service (one-stop-shop)

Evidently regional administration in joint efforts with municipal authorities, are most conducive to developing synergy projects for locating vulnerable households and achieving economies of scale. Through integrated action plans, synergies have the potential to secure benefits for all stakeholders, increase risk-sharing and secure European funding. The new framework for

⁹⁹ Energy Efficient Mortgages Action Plan webpage (July 2019). Available on: <http://bit.ly/energypoverty-99>

¹⁰⁰ Les Amis d' Enercoop webpage (July 2019) Available on: <http://bit.ly/energypoverty-100>

¹⁰¹ iBRoad – Building Renovation Passports webpage. Available on: <http://bit.ly/energypoverty-101>

¹⁰² Carbon Co-op webpage. Available on: <http://bit.ly/energypoverty-102>

energy cooperatives and obligation schemes can drive energy poverty tackling efforts by mobilising capital to be allocated to vulnerable households. Therefore in collaboration with the empowered National Energy Poverty Observatory, regional authorities could stimulate residential buildings' energy upgrade interventions financed by European funds. Insights gained by previously applied practices may offer guidance on financing matters, on techniques, on designing etc. Development of an integrated energy upgrade/renovation service (one-stop-shop) to serve as consultation and guidance hub throughout the renovation process is a decisive step towards successfully implementing the above-mentioned practice. This service will be equipped with the means to provide citizens with tailored information on the wider benefits of energy retrofit (environmental benefits, financial benefits, improved quality of life etc.) and guidance on prioritized implementation of the most effective energy saving practices, utilisation of funds and available programmes etc. Parallel to this, an innovative tool like the "Individual Building Renovation Roadmaps" can assist in drafting a customised energy upgrade "business plan" for citizens who express interest (see iBRoad section above).

B. Promoting synergies and collectives to secure initial capital

Combining various stakeholders in a collective scheme may prove essential in developing energy upgrade projects for vulnerable households. To guarantee success, Public-Private Partnerships (PPP) could be formed by local governments' agents, citizens' associations, construction – or pertaining to construction – companies, energy service companies, energy providers operating in the obligation schemes, banks, non-governmental organisations etc. The new legal framework for Energy Communities drives and facilitates development of such schemes inspired by successful practices like the Energie Solidaire project (see Energie Solidaire section above).

Considering the successful example of LABEEF (Latvian Baltic Energy Efficiency Facility) it is assumed that de-risking of investments upon task completion by an agent collaborating with a banking institution, is the keystone of such project's success. This way, the energy service companies (ESCOS) do not carry the full burden of the investments' credit risk and are thus permitted to proceed to new projects. Adopting policies guided by the framework which stipulates obligation schemes' operation, sets municipal and regional targets, clarifies businesses' social responsibility and reduces prices due to feasible economies of scale, is of paramount importance.

Concurrently, developing residencies' energy retrofit could assume collective characteristics and be applied on blocks of flats or districts. Admittedly, radical energy upgrade interventions on a building as a whole are more energy and cost-efficient compared to mild upgrade interventions on buildings' envelopes concentrating mainly on flats. Interventions on the building's envelope (thermal-insulation, replacing frames) reduce heat loss and increasingly utilise RES while taking advantage of conventional fossil fuels' heating systems (e.g. solar panels connected to central heating system for thermal comfort and domestic hot water). The benefits of flat owners' collective cooperative at neighbourhood or district level (e.g. Carbon Co-op) have been verified by good practices worldwide. Collective management allows for the emergence of economies of scale while facilitated access to financing sources leads to widespread implementation of energy upgrade projects.

In Greece, development and effective operation of schemes with such institutional and technical characteristics encounter obstacles due to lack of incentives and limited collective solidarity-based mentality. The below-mentioned suggestions aim to assist in overcoming these obstacles:

- **Actions on blocks of flats.** Awareness actions can inform owners and leaseholders about the financial and environmental benefits deriving from a joint, well-organised energy upgrade and improve the quality of their cooperation. These actions could be held by the Energy Poverty Information Desk (see section 4.1) jointly with various agents such as Energy Communities, engineers social enterprises, shared utility bills management companies, technical construction companies, electricity providers (as stipulated in the Energy Efficiency Obligation Schemes) etc. An awareness-raising campaign of such scale could form a sound foundation upon which to build bonds of trust between tenants and stakeholders who could undertake coordination and management of bureaucracy spawned from a building's deep energy retrofitting. The particular need becomes clearer when the high percentage of small-holders in Greece is considered.
- **Actions at neighbourhood/district level.** Participation in energy cooperatives generates many financial benefits for citizens, shop-owners etc. in any district. These benefits include supply of construction materials or energy saving interventions services (economies of scale), competitive prices on energy supply, production, storage or even exchange of energy generated from renewable sources. Additionally, members of the cooperative could offer consulting services, encourage purchasing and retrofitting of bankrupt or vacant residencies etc. Local agents and social enterprises of various professional fields (engineers, construction technicians, etc.) could join these initiatives in order to encourage tax incentives and attract European funding. By attributing value to experience gained by the "Workers' Housing Organisation" programme and the European Federation of Public, Cooperative and Social Housing, Housing Europe network¹⁰³ (Housing 4all, LEMON project, Transition Zero etc.), collective schemes could significantly affect social housing policy. Finally, through interaction with local agents and local communities and by encouraging cooperation and autonomous organisation of social enterprises the schemes could be admitted to the "local ecosystems" of social solidarity-based economies. Thus, they would be able to plan and develop common services and capitalise on local resources for the benefit of local communities.

C. Tax-reliefs for energy upgrade products and services

Tax-reliefs on energy products and services could be enacted as substitute measure for allowance-based policies so as to provide owners with extra incentive for radical renovations and at the same time increase public revenue by terminating irregular activities. Appended to the Energy Poverty National Strategy, these tax-reliefs should adhere to certain criteria to assess vulnerable households' eligibility.

¹⁰³ European Federation of Public, Cooperative and Social Housing, Housing Europe network webpage. Available on: <http://bit.ly/energypoverty-103>

D. Linking mortgages to energy renovation schemes

Several “risk analyses” conclude that energy efficiency interventions in residencies have a risk mitigating effect for banks as a result of the impact on a borrower’s ability to dispose income in their household and service their loan¹⁰⁴. In the case of non-performing mortgages a correlation between energy upgrade and lower interest rate plus reduced monthly instalments rate could be fostered. This will guarantee bonus for the borrower and risk mitigation for the bank. Along with primary residence protection measures and small loans approval from cooperative banks, the aforementioned measure has the potential to decrease the rate of vulnerable households that cannot afford energy retrofit investments on their residencies due to lack of capital along with a certain degree of reticence towards the banking sector.

E. Framework for energy renovation studies and vulnerable households’ Energy Performance Certificates

Based on insight gained from previous projects, this final proposal highlights the need to improve energy upgrade/renovation studies and buildings’ certification process, to empower energy auditors and to process the BuilingCert’s database so as to integrate facts and conditions pertinent to energy poverty and the users’ particular profiles. It is also suggested that Energy Performance Certificates be upgraded and evolve into information mediums via which owners could plan radical energy upgrades and access financing sources. The European Union funded iBRoad programme contains an updated description of such a model.

CONDITIONS

The main obstacle encountered during implementation of energy efficiency measures is lack of initial capital since most energy poor households have restricted access to financing sources. As noted above, collective/cooperative schemes can assist in surpassing this impediment.

Good practices of energy upgrade programmes are based on stakeholders’ (public and municipal authorities, social enterprise, energy companies etc.) synergies for fund allocation to vulnerable – or not – households. Electricity providers and companies pertaining to construction and real-estate could play a vital role in meeting energy saving targets set under the guidance of the European Commission’s directions (obligation schemes) and in improving their image in the competitive energy market.

Ensuring that revenue generated from energy efficient practices will be directed to loan repayments is essential in increasing the number of loans approved for vulnerable households.

Lack of collective solidarity-based mentality along with reluctance towards money borrowing for energy saving projects is a matter that has to be confronted. To this end, piloting actions could be tried in municipalities which advocate innovation. To ensure success of such actions, it is mandatory that the national energy poverty strategy (Action plan) provide for full utilisation of European Commission funding and other financing sources. The process of locating energy vulnerable households should be stipulated by effective and clear eligibility criteria. Apparently

¹⁰⁴ European Mortgage Federation (2016): HYPOSTAT – A review of Europe’s mortgage and housing markets. Available on: <http://bit.ly/energypoverty-104>

strong initial capital is needed for deep energy renovations on buildings therefore the majority of low-income residence owners do not qualify for bank loans. Instead, they rely solely on programmes such as “Saving at Home”. In spite of government efforts to reinforce the programme’s social aspect, many owners are still excluded from the scheme due to low income and low credit ratings (see section 2.5).

Overall objective of the National Energy Poverty Strategy should be to mitigate the investment risk entailed in low-income vulnerable households. Customised programmes and certain de-risking policies ought to be applied in order to include this population group in loan financing. At the same time, provisions should be made to address conflicting interest between owners and leaseholders by factoring the upgraded residency’s energy efficiency into the property’s market value (see RenoValue project¹⁰⁵). In addition, used by prospective investors as evaluation criterion, energy efficiency may render an investment sustainable (see Investor Confidence project¹⁰⁶). Finally, based on the “Energy Efficiency Mortgages Action Plan” programme, energy efficiency loans have the capacity to generate minor benefits for all stakeholders – loan borrowers, mortgage lenders, investors and governments while they might also guarantee wealth preservation, risk mitigation of likely loan defaults as well as safeguarding of capital and energy savings. Credit risk-sharing with other credit institutions and actors could be a viable alternative till the banking sector becomes convinced of the low credit risk entailed in energy efficiency loans.

4.4 RENEWABLE ENERGY SOURCES UTILISATION

TARGETS

Along with energy upgrade interventions on the buildings’ envelope and replacement of conventional household appliances with more efficient ones of higher energy class the Renewable Energy Sources are listed as measures that once financed adequately, have the potential to form a sound foundation for tackling energy poverty¹⁰⁷. Utilisation of RES technologies is conducive to citizens’ active involvement in the energy system and their transition from consumers to prosumers (producers-consumers)¹⁰⁸. Development and application of energy tools such as net metering, virtual net metering and smart meters renders this vision feasible. Correspondingly, these tools equip citizens with the means to consume on-site generated energy, to use net metering to offset energy consumed with energy generated nearby and to smartly manage energy generation and energy demand at any given moment.

Regardless of the RES system’s nature (photovoltaics, wind parks, small hydroelectric or geothermal stations etc.) or the purpose of its operation – be it facilitator of self-consumption or product of a collective scheme’s effort (citizens, agents’ synergies, local authorities, businesses etc.) – all stakeholders stand to gain from the generated benefits. Investments of such

¹⁰⁵ RenoValue project webpage. Available on: <http://bit.ly/energypoverty-105>

¹⁰⁶ Investor Confidence Project webpage. Available on: <http://bit.ly/energypoverty-106>

¹⁰⁷ EU Energy Poverty Observatory: Guidance for Policymakers. Available on: <http://bit.ly/energypoverty-107>

¹⁰⁸ Office of Energy Efficiency & Renewable Energy: Consumer vs Prosumer. What’s the Difference? Available on: <http://bit.ly/energypoverty-108>

nature and their promotion through targeted funding are instrumental in ameliorating quality of life for households belonging to vulnerable population groups suffering from or being threatened by energy poverty. This can be accomplished via energy costs reduction which is translated into income savings to be disposed on other household needs such as nutrition, education, debts etc. Through the formation of collective RES projects, provision of free or low-cost energy to vulnerable households is possible, as also is the prospective sale of excess energy the financial profits of which can be allocated to vulnerable consumers in the form of discount in their energy bills. Lastly, cost saving is equally feasible and allows stakeholders to finance innovative social policies to curb energy poverty.

GOOD PRACTICES

The legislation on *Energy Communities* that was introduced and established by Law 4513/2018 of the Greek Parliament¹⁰⁹ in January 2018, and the even more extensive use of virtual net metering by not only self-producers but Energy Communities as well constitute important steps towards utilising RES to citizens' advantage¹¹⁰. The overall objective of its framework is set on promoting Social and Solidarity-based Economy in the energy sector and clear reference to energy poverty tackling is made. Partaking in citizens' collectives or agents' synergies (municipalities or mid-sized businesses' synergies), offers citizens the opportunity to invest in European funded RES projects by utilising local energy resources for own benefit and the benefit of the local community. According to Law 4513/2018 of the Greek Parliament, these cooperatives operate exclusively in the energy sector and advocate decentralized RES production. Energy distribution (electricity, thermal energy etc.), energy supply and energy saving services are integral to its vision.

The prospect of establishing Energy Communities in Greece has been received with great interest and several initiatives aiming at safeguarding vulnerable households and tackling energy poverty have already sprung up. Initiatives of the kind have been in place in many European countries for more than 20 years. The first Energy Communities in Germany were established in the 1980s and more than 800 Energy Communities are to be found nowadays numbering 160,000 members. Energy cooperatives in Denmark focus mainly on wind energy production and represent more than 150,000 families who have been involved since 2001. Som Energia is an Energy Community in Cataluña, Spain which has been operating since 2016 and numbers 27,000 members who accommodate the energy needs of 3,200 families. The pivotal role of the Communities in advocating a socially just energy transition has been studied extensively whereas quality of life amelioration for vulnerable households, residencies' energy efficiency increase and reduction in energy consumption have been accomplished through their actions. In Greece:

- The **Energy Cooperative of Karditsa** was established in 2010 in the region of Thessalia¹¹¹. It comprises 400 members among whom citizens, businesses, specialists, farmers, craftsmen, quarries, industries etc. Wind turbines as well as energy storage and self-management digital

¹⁰⁹ Law 4513/2018, Statement on "Energy Communities and other provisions".

Available on: <http://bit.ly/energypoverity-109>

¹¹⁰ B2Green (March 2019): «Government Gazette on net metering & virtual net metering & on Energy Communities».

Available on: <http://bit.ly/energypoverity-110>

¹¹¹ Karditsa Energy Cooperative Facebook page. Available on: <http://bit.ly/energypoverity-111>

systems have been installed and a biomass production unit (pellet) is in operation. Upon enactment of the new Energy Communities framework which guides energy poverty policies, the members of the Cooperative decided to make the transition from civil cooperative to Energy Community so as to widen the scope and deliver the generated benefits to the local community.

- The **Peloponnese Energy Community** has been established in the region of Peloponnese and is soon to begin operation. Its funding members are the Region of Peloponnese, the Regional Development Fund, the local development company Peloponissos Inc. and the Municipality of Megalopolis. The Community is a non-profitable organisation that pursues energy sustainability, clean energy in agriculture and energy poverty mitigation for low-income households¹¹².
- A memorandum of cooperation was signed by the Technical Chamber of Aitolokarnania, the Technical Chamber of Western Greece, Western Greece Region, the University of Patras and the Technological Educational Institute of Western Greece in order to establish an **"Electricity Consumption Observatory in Publicly Managed Buildings in Western Greece"**¹¹³. Via use of smart meters electricity consumption will be registered in real-time. This will enable the Observatory to plan actions and interventions to decrease consumption and upgrade buildings energy performance after processing and evaluating the data. At the same time, awareness-raising campaigns with the long-term target of establishing an Energy Community will be held to inform the public, local agents and businesses about energy saving actions and sustainable growth.
- **Several municipalities in the country such as the Municipality of Alexandroupolis and Samothrakis¹¹⁴, the Municipality of Oraikastro¹¹⁵, the Municipality of Kozani¹¹⁶, the Municipality of Rhodes etc. are pursuing RES energy generation.** By allocating benefits among Communities with a mind to foster successful cooperation among local bodies, the above-mentioned Municipalities have installed RES systems by applying net metering and virtual net metering to assist in energy poverty combating.
- With the **awareness campaign "Ilie mou, Ilie sou" ("My sun, Your sun")**¹¹⁷ Greenpeace invites citizens-consumers to exert mild pressure on authorities by writing letters to their respective municipalities requesting increase of their solar and social footprint via photovoltaic systems installation that will provide free RES generated electricity to vulnerable households. Greenpeace presented a cost proposal for a green social electricity tariff¹¹⁸ which provides for per-

¹¹² EnergyPress (January 2018): The Region of Peloponnisos establishes the first Regional energy Community in Greece. Available on: <http://bit.ly/energypoverty-112>

¹¹³ EnergyPress (July 2018): Electricity Consumption Observatory in Western Greece. Available on: <http://bit.ly/energypoverty-113>

¹¹⁴ EnergyPress (October 2017): The first Energy community to be created by Municipalities of Alexandroupolis and Samothrakis in a joint effort with the Alexandroupolis Holy Church. Available on: <http://bit.ly/energypoverty-114>

¹¹⁵ EnergyPress (February 2019): The Municipality of Oraikastro establishes Energy Community. Available on: <http://bit.ly/energypoverty-115>

¹¹⁶ KozaniLife (April 2019): The Municipality of Kozani establishes Energy Community – Benefits for the Municipality and residents. Available on: <http://bit.ly/energypoverty-116>

¹¹⁷ Greenpeace Greece. "Ilie mou, Ilie sou" ("My sun, Your sun") campaign webpage. Available on: <http://bit.ly/energypoverty-117>

¹¹⁸ Greenpeace Greece (January 2019): Solar Social Policy in Greece. Available on: <http://bit.ly/energypoverty-118>

manent disengagement of 340,000 vulnerable households from the current Social Electricity Tariff. This could be achieved either by providing them with a no-cost residential photovoltaic for self-generation or via dividends in an Energy Community which will run a photovoltaic park.

- **The European Federation of Renewable Energy Cooperatives – REScoop**, is a growing network of 1,500 cooperatives and 1,000,000 European citizens. Via utilisation of Renewable Energy Sources, REScoop aims to inform and empower citizens to make the transition to active energy prosumers (consumers-producers) who will ultimately democratise the energy system. Under the supervision of REScoop several European projects have run in parallel; for instance REScoop plus which by encouraging energy solidarity¹¹⁹ and energy saving hopes to increase vulnerable households' energy efficiency. These actions intend to consult vulnerable low-income households' on power self-generation and facilitate access to the benefits generated by surplus energy¹²⁰.
- The **initiative Interreg Europe COALESCCE**¹²¹ is listed among the European programmes which invest in Energy Communities aiming to increase households' energy efficiency. 7 countries have joined the initiative – the United Kingdom, Spain, Italy, Bulgaria, Rumania and Hungary. One of its main objectives is to drive local energy investment through European Structural Funds that will be used by regions to finance energy generation projects through Energy Communities and to develop integrated action plans in order to materialise the vision for low-carbon economy.
- **Horizon 2020 – Compile**'s¹²² purpose is to highlight the means for emissions reduction and encourage clean energy production on islands. Listed among its main objectives is fostering the creation of Energy Communities to financially support vulnerable households and stimulating local actors in order to maximise societal benefits, adopt technological solutions and enable a large scale replication of successful business models. Pilot actions of the project are in progress in Spain, Portugal, Greece, Slovenia and Croatia with the aid of India and China.

PROPOSED ACTIONS

Apart from the desired transition from consumers to prosumers, energy bills reduction and energy poverty mitigation, the below-mentioned proposals will facilitate the release of adequate funds to accommodate energy needs and settle pending energy issues such as energy import, greenhouse gas emission fees etc. By adhering to the guidelines on buildings' energy upgrade programmes and social policies for financial and energy poor citizens, these funds will be allocated accordingly nationwide.

¹¹⁹ ReScoop webpage: Energy Solidarity. Available on: <http://bit.ly/energypoverty-119>

¹²⁰ ReScoop: Local Energy Communities: a way to bring 'all Europeans' along in the energy transition. Available on: <http://bit.ly/energypoverty-120>

¹²¹ COALESCCE webpage. Available on: <http://bit.ly/energypoverty-121>

¹²² Compile project webpage. Available on: <http://bit.ly/energypoverty-122>

A. Empowering energy self-generation – self-consumption in households

An integrated national policy should stipulate provisions for RES systems installation in residences and facilitate access to financing. These actions will prove instrumental in utilising green energy generation, in increasing RES contribution rates to final consumption and in curbing energy poverty. The publication of the Ministerial Order on developing Energy Community power plants with the application of virtual net metering renders the particular legal framework more favourable for such ventures. However, radical transformation is mandatory if we wish all citizens to be empowered – especially vulnerable population groups facing challenges pertaining to low-income and inadequate access to financing or energy loans. To this end, a set of proposals is described:

- Introduction of tax-reliefs for in-depth study, supply and installation of RES systems for citizens belonging to vulnerable population groups.
- Development of adequate financial products for RES systems' installation in vulnerable households with European funds utilisation to mitigate credit-risk on behalf of credit institutions. Also, loan repayment should be linked to financial benefits deriving from self-consumption and energy saving from deep energy upgrades in the form of Energy Performance Contracting.
- Designing a special "Saving at Home" programme addressed to members of vulnerable population groups will allow no-cost RES systems installation.

B. Establishing Energy Communities

Establishing Energy Communities can contribute most effectively to energy poverty tackling locally since one of its fundamental principles is channelling generated benefits to their members and to local community. Primary activities of an Energy Community – production, storage, self-consumption or energy sale – as well as secondary ones – smart meters supply and consultation on energy saving – are contingent upon involvement of local actors and collaboration with local community. The legal framework makes a clear distinction between profitable Energy Communities and non-profitable ones. The distinction is based upon their constituent members and their capacity to supply excess energy¹²³. Profitable Energy Communities constitute large collective schemes whose members are mostly individuals, entitled to excess energy distribution. The amount of shares in the cooperative is crucial for the admission of low-income individuals and might occasionally prove discouraging. This barrier has been surpassed by cooperative schemes in Greece and abroad via micro-lending to prospective Community members and gradual loan repayment either in set instalments or by provision of services to the cooperative. On the other hand, non-profitable Energy Communities are established by public or private law legal entities not entitled to excess energy distribution. Vulnerable population groups affected by energy poverty could benefit from both types of Energy Communities. For example, an Energy Community created by municipal and/or regional authorities in collaboration with local entrepreneurs or businesses for RES systems installation will have the means

¹²³ Heinrich-Böll Foundation (August 2019): Building Energy Communities in Greece – Energy in the hands of citizens, pages 30-31, Available on: <http://bit.ly/energypoverty-123>

TABLE 5: Energy Communities at city level

ENERGY COMMUNITY AND MEMBERS	SYSTEM IMPLEMENTATION	BENEFITS
House/flat owners or in neighbourhoods/districts	<p>Photovoltaics/small wind power system installation with net metering or virtual net metering if the installation can be established on the outskirts of the city</p> <p>Offsetting between energy generated and energy consumed for households participating in the Energy Community or feed excess energy to electricity network</p>	Reduced energy bills for all Member Households of the Energy Community
Local businesses (e.g. 3 hotels or 5 stores)	<p>Photovoltaics/small wind power system installation with net metering or virtual net metering if the installation can be established on the outskirts of the city</p> <p>Offsetting between energy generated and energy consumed by businesses/stores participating in the Energy Community or feed excess energy to the electricity network</p>	Reduced energy bills for all businesses/stores participating in the Energy Community
Local Governments (e.g. 4 distinct local governments)	<p>Photovoltaics/small wind power system installation with virtual net metering</p> <p>Offsetting between energy generated and energy consumed by low-income vulnerable households/vulnerable groups</p>	Reduced energy bills or/and no-cost energy supply to low-income vulnerable population groups
Local synergies (citizens, 2 local businesses, municipality)	Thermal energy production units installation for members' or vulnerable households' heating needs via distant heating	Reduced energy bills for all Energy Community Members and/or no-cost heat distribution to vulnerable households via district heating

to provide affordable or free energy to low-income households. Likewise, in Communities operating in blocks of flats or at district/neighbourhood level, the entirety of citizens may benefit from self-generation – self-consumption and by extension from reduced energy bills. Some examples of Energy Communities that could be established in cities and their corresponding benefits for citizens are illustrated in Table 5.

C. Renewable Energy Sources energy supply in the network at more affordable prices, “Energy Contract”

Final energy prices can hardly be reduced on account of obstacles which consumers encounter in making the transition to energy prosumers, due to lack of transparency regarding the origins of consumed energy and finally because of high levies and fees that increment energy bills. It is recommended that in order to surpass these impediments the percentage of RES contribution in the energy network be increased. In addition, upgrading and promoting capacity for electricity self-generation – self-consumption in residencies via net metering is equally vital. As pointed out above, Energy Communities have the means to empower consumers to this end.

At the same time though, consumers must be informed about the energy’s origins and be granted access to knowledge and possibilities such as eased process for switching suppliers, smart meters’ installation to monitor consumption, safeguarding against irregular market practices etc. A statutory “Consumer’s Energy Contract” ought to contain these practices that first and foremost safeguard consumers who are called to assume a vital role in energy plans implementation and in the system’s management so as to make full use of their capacity as consumers and benefit from the energy transition.

TABLE 6: Examples of RES systems utilization in combating energy poverty

RES SYSTEM	INTEGRATION PROPOSAL
Photovoltaic systems	Rooftop installations or on land, property of the Energy Community or leased or granted to it for use by a public body
Small wind turbine	System installations on land, property of the Energy Community or leased or granted to it for use by a public body
Solar thermal systems	Installations in blocks of flats, hotels, craft industries etc. property of the Energy Community or leased for use
Biomass energy systems	System installations on land, property of the Energy Community or leased or granted to it for use by a public body
Geothermal energy systems	System installations on land, property of the Energy Community or leased or granted to it for use by a public body

COST	USAGE-CONTRIBUTION	BENEFITS
Low <i>Initial capital needed for system's purchase/installation</i>	Electricity generation and supply to households or application of net metering Encouraging self-generation – self-consumption by households	<ul style="list-style-type: none"> • Reduced energy bills • Funds to finance policies (social, environmental etc.) or energy saving interventions <i>Depending on the Energy Community type</i>
Average – High <i>Initial capital needed for system's purchase/installation</i>	Electricity generation and supply to households or application of net metering Encouraging self-generation – self-consumption by households	<ul style="list-style-type: none"> • Reduced energy bills • Funds to finance policies (social, environmental etc.) or energy saving interventions <i>Depending on the Energy Community type</i>
Low <i>Initial capital needed for system's purchase/installation</i>	Domestic Hot Water (DHW) production	<ul style="list-style-type: none"> • Reduced electricity bills • Funds to finance energy saving interventions
Low <i>Initial capital needed for system's purchase/installation</i> <i>Provisions for biomass supply chain</i>	Energy generation (heating, DHW) and supply to households, businesses and craft industries	<ul style="list-style-type: none"> • Reduced energy and electricity bills • Funds to finance energy saving interventions
High <i>Initial capital needed for system's purchase/installation</i> <i>Expensive technology due to infrastructure</i>	Energy generation (heating, DHW) and supply to households, businesses and craft industries	<ul style="list-style-type: none"> • Reduced energy and electricity bills • Funds to finance energy saving interventions

PREREQUISITES TO SUCCESSFUL ACTIONS

Integrating RES in the effort to combat energy poverty is part of a strategy which requires joint efforts of stakeholders and individuals as well as collective plans of action. More specifically:

- Introducing integrated European policy to be extended and applied at national level**
 A pan-European policy to empower vulnerable households in such a way as to generate energy via RES and reduce energy bills should be developed in an integrated manner that will secure adequate financing tools and funding. The policy should adjust accordingly to each Member State's legislation.
- Effective collaboration of multiple bodies**
 Being by definition collective initiatives, Energy Communities ought to form bonds of trust and foster tight collaboration among various bodies such as municipalities, research centres, scientific institutes, social and environmental agents, local entrepreneurs, businesses/industries, association and citizens' groups. Proper operation of the Communities should deliver essential measurable outcomes for their members and for vulnerable households.
- Awareness-raising campaigns and instruction on RES systems**
 Instructing citizens on the basic principles of RES systems is the keystone of successful inception of the Energy Communities venture. Member-citizens should comprehend the positive impact of RES integration on local economy, on energy saving and on de-carbonisation. Sufficient understanding will reinforce their trust in collective ventures and encourage them in assuming more active role in the energy system.



AFTERWORD

The study *Energy Poverty in Greece: Social Innovation Recommendations to tackle the phenomenon* was a collaborative project between the INZEB and the social cooperative enterprise “Anemos Ananeosis” (“Wind of Renewal”) that was published in 2017 and constituted the starting point of the current edition. The study aimed to paint a vivid picture of the phenomenon’s detrimental effects on Greek citizens’ lives and mainly to highlight its multifaceted nature by demonstrating available data on energy poverty.

The particular study also compiled proposals to address energy poverty which dictated the urgency for a shift from allowance-based policy measures which only temporarily relieve citizens, towards a holistic strategy that will place citizens at the heart of the solution. To this end, empowering the role of citizens and encouraging their active participation in collective schemes as well as raising awareness about sensible energy use and energy generated from Renewable Energy Sources are of the utmost importance. Finally, an embedded crucial parameter guiding all proposals is the development of stakeholders’ synergies which will drive European and national financing to achieve residential buildings’ energy upgrade.

The present study’s target setting works along the same lines and takes a step further by clearly pinpointing the link between just energy transition and energy poverty tackling efforts. A series of developments in European and national energy and climate change policies (Clean energy package for all Europeans, National Energy and Climate Change Strategy, current legislation - Law 4513/18 of the Greek Parliament - on Energy Communities, National Energy Poverty Observatory etc.) clearly point to the aforementioned link, the pivotal role of the citizens and arguably the urgency to safeguard citizens through an energy model that makes the transition from fuel dependency to decentralised energy generation.

With regard to the aforementioned statements, the present study *Energy Poverty In Greece: Policy developments and recommendations to tackle the phenomenon*, contains sustainable social innovation proposals which take into account current developments and focuses on raising citizens’ awareness on energy issues while at the same time it underpins the correlation between energy saving and clean energy production the acknowledgement of which will assist in our efforts to effectively combat the underlying causes of energy poverty. As in the case of our former publication, we trust that the proposals contained in the current study will prompt public debate and will be considered during the process of drawing up the National Energy Poverty Action Plan.

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